UNIVERSITY OF TORONTO
3 1761 00658997 2

Digitized by the Internet Archive
in 2010 with funding from
University of Toronto

http://www.archive.org/details/minemanagementpr00virg

MINE MANAGEMENT

I

A

MINE MANAGEMENT

A PRACTICAL HANDBOOK FOR USE IN VOCATIONAL SCHOOLS, MINING COLLEGES AND UNIVERSITIES. ALSO FOR USE OF FIREMEN, DEPUTY UNDERGROUND MANAGERS, AND OTHERS WHO ASPIRE TO BECOME MANAGERS

BY

ROBERT Z. VIRGIN

ASSISTANT PROFESSOR COAL MINING, CARNEGIE INSTITUTE OF TECHNOLOGY, PITTSBURGH, PA., LATE ASSISTANT DIRECTOR MINING EXTENSION, WEST VIRGINIA UNIVERSITY, MORGANTOWN, W. VA., MEMBER OF THE AMERICAN INSTITUTE OF MINING ENGINEERS AND FOR TWENTY-FIVE YEARS WAS FIREMAN, UNDER-MANAGER, AND COLLIERY MANAGER OF COAL MINES IN PENNSYLVANIA AND WEST VIRGINIA

194463
18.2.25

LONDON

SAMPSON LOW, MARSTON & COMPANY

Limited

TN
274
V57

INTRODUCTION

THE subject of mine management is very important in connection with coal mines, yet has been written upon very rarely and sparingly, and the young student of works management as relates to coal mining is handicapped by a lack of text matter upon this important subject.

The writer, seeing this necessity for a coal mine management text, has endeavoured in a brief way, and as simply as possible, to write this text from personal experience acquired by twenty-five years' service and experience as a coal miner and mine official.

The subject matter will be found plain, concise, and to the point, containing the essential principles and information needed in managing modern mines.

R. Z. V.

NOTE

In teaching the various thoughts contained in this text you will greatly increase its value, by substituting questions and terms that are in common use in the neighbourhood where the school is located.

Passing from one lesson to another hurriedly, is not productive of the best results. Plenty of time should be allowed the students, to absorb the ideas which are intended to be conveyed, and if the questions given after each lesson are answered and written out when the student is out of the class room, it will give him the practice of writing, making forms, etc., that are so essential to the work of a works' manager.

The thoughts have been carefully arranged, and have suggested themselves to the writer during his twenty-five years' experience and service as a mine manager, and if the thoughts are properly conveyed to the student, there is no doubt as to them being of the highest value to the young executive just starting at the coal mines.

The subject matter being divided into lessons will be found much more convenient for teachers than the continuous text with questions at the back of the book.

Some of the lessons can be greatly elaborated upon and others treated as conveniently as the teacher sees the need.

The lessons do not overlap each other, therefore can be used promiscuously or in numerical order.

CONTENTS

LESSON I

PAGE

Workmen are divided into Classes — Colliery Manager's Work considered — Who represents the Company — Making his Start — The Jobs higher up — Passing Examinations — What the Certificate is for — Losses to the Company — Management a Complex Subject — Advisory Capacity of a Colliery or Mine Manager — Letters announcing Meetings — Letters of Censure — Questions 1

LESSON II

Under-foremen — Giving Visible Encouragement — Going over Bosses' Heads — Diplomacy and Tact — Co-operation, Confidence and Good Will — Educating an Official — Frequent Changes Expensive — Inefficiency Period — Labour Turnover — Workmen's Minds on Other Things — Encouragement pays — Hiring and Firing — The Employment Manager — Questions . . 8

LESSON III

Employing the Best Information — Managerial Conferences — Matters of Local Interest — Wrong System — Misunderstandings — The Casual Visitor — Cut and Dried Systems — Before and after Mistakes — Near Breaks — Red Tape — Imaginary Grievances — Arm of Strike is Long — Knowing Costs — Giving Credit — Systems of Payment — Problem of Staff Building — A Man's Size — College-trained Engineer — Engineer's Qualifications — Questions 13

LESSON IV

Under-Manager's Report — Tonnage Sheet — Warning of Rising Costs — Irregular and Part-time Work — Keeping Men working after Mine quits — Cause of Delays — Discovery of Gas — Three Laws of Friction — Supplies not received — Reporting Personal Injuries — Safety to Employees — Take no Chances — Employee had Checked Out — Non-producers — What Report should show — Disposal of Refuse—All to gain and nothing to lose — Questions 19

LESSON V

PAGE

Inspectors — Compensation Rates — Safety Inspector — Sending Reports to City Office — Reports in Full — Giving a Written Order — Return of Order after completion of Job — Special Forms — Workmen building Additions to Residences — Surface Drains — Unsatisfied Employees move away — Faulty Hydrants and Pumps — Questions 28

LESSON VI

Quality of Output — Relaxing Vigilance — Team Work — Vital Factors — Confidence necessary — Kind of Service that Pays — Indifference — Analyzing the Business — Mine is run for Investment — What the Contracts call for — Loading Coal by Machinery — Cleaning Railroad Cars in Winter Time — Frozen Pieces of Iron and Stone hard to remove — Warm Coal loosens the Frozen Pieces — Refuse breaks the Crusher Rolls — Rightly chargeable to Loader — Familiarity with Type of Railroad Equipment — Agreeable and Attractive Service — What the Industry calls for — Questions 33

LESSON VII

Time of Delivery — Disappointment expensive to Consumer — Demurrage Charges — Losing the Contract — Danger of Slipshod Methods — Satisfying the Customer — Complaints — Visiting the Consumer's Plants — Recommending Betterments in Service — Making Periodical Visits — Investigating Complaints — Cementing the Efforts of the Workmen — Recommendations or Censure not always good — Seeing Minor Faults in Coal — Learning the Other Job — The Successful Manager — Choosing New Material — Moulding Young Men into Shape — Questions . . 40

LESSON VIII

Social Life — Like a Large Family — Community Gatherings — Company Officials' Management — Not always best — Paternal Spirit shown — An Expensive Undertaking — Board of Managers — Strong Arm Methods obnoxious — Not a Substitute for Wages — Commendatory Movement — Looking ahead for Chances — Visit Other Places for Amusement — Loses Working Time — Loss of Output to Company — Titles assumed — Leaders' Prestige Questions 46

LESSON IX

Earnings set aside — Total Costs first — Set-offs for Depletion and Depreciation — The Mine Worker an Asset — Employees helped by Charitable Motives — Compensation Insurance —Haz-

PAGE

ardous Occupations — Extra Premium demanded — Collecting Increased Rates from Public — No Difference in Comparison with Other Businesses —Operators are now taking Advantage — Painful for Co-worker to testify in Court — Sueing for Damages — Delaying Compensation is Expensive — Compensation removes Charity — Main Office Decisions — Mine Managements' Duties not alike — Question of financial possibility of taking advantage of small mines. Public must pay in the end — Questions . . 51

LESSON X

Educational Facilities — Workers are Cosmopolitan — What makes Plant attractive to Workers — Services of Educated Men and Women needed — Manager's Duties not to teach School Subjects — Education a Barometer — What constitutes Education — The Instructor and Underground Manager — Education is a Liability — Fear of Educating Employees away from the Mines — Men leave for Other Fields of Employment — Advanced Ability not recognized — Management collapses without New Blood in Make-up — Broad Gage View — Federal Board for Vocational Education — Place to get Information — Educational Scheme successful by West Virginia University — Taking the University to the Mine — Educational Scheme conducted by Carnegie Institute of Technology — Résumé — Questions . . 57

LESSON XI

Differences of Opinion — Basic Foundation — Worker and Employer — Labour Controversies exist in all Industries — Not always for Money — Permanent Factors considered — When they Divorce Themselves — Problems of Financial Stamina — The Workers' View — The Employers' View — The Base upon which Equity is built — Conception of Fairness — Formulation of Associations — Labour Unrest — Strike of 1919 — Questions . 64

LESSON XII

Making Changes — No consideration given to Parties not visible — Formulation of Combinations — A Step in the Right Direction — The Third Party — Arbitration Method — Final Decision — Misunderstanding of Terms — Constructive Adjustments — Agreements should be studied — Short-lived Results — Public Sentiment — Storms of Competition — Loyalty and Co-operation — Questions 68

LESSON XIII

Cessation of Work — Burdens upon Society — Responsibility increases with Power — Analyze Clearly — Should have Confidence in Each Other — Resumption of Business — Co-operation

PAGE

practiced in War with Germany — Co-operation necessary to Success and Satisfaction — Pleasing and Lasting Labour Adjustment — Workers' Education neglected — Appearance of a Slacker and Walking Delegate — The Workmen become Restless — Should be encouraged to Study — Where to get Text Books Free — Questions 72

LESSON XIV

Overhead Expenses — Taxes — Not meant to create Tax Experts — Rising Costs should be Investigated — Collective Energies — Concentration — Taxes should fall after Partial Extraction of Coal — Developed and Undeveloped Coal Lands — Triennial Assessments — Where Managers can help Themselves — Large Properties retain Legal Talent — Small Properties expect Mine Manager to care for this Problem — New Light on Taxes for Manager — Fire Hazards — In Mine and on Outside — Materials to use — Danger of moving Fire Apparatus — Material destroyed by Fire — Management should anticipate Fires — Chemical Extinguishers — Where to locate them — Questions . . . 76

LESSON XV

Prolific Source of tying up Capital — Too many Different Sizes of Mine Rails are used — Foresight was not used at the beginning of the Operation — Mine Tub Sizes should be thoroughly worked out — Sizes of Rails for stated Size Tubs — More security from Large Sizes, but they are harder to handle — Size of Stocks of Ties — Using the Wrong Sized Spikes — Reasons for Poor Spike Recovery — Workmen not Indifferent to Conservation — Must be made to Understand — Reasons for Loss of Pit Props — Tubs should be Standardized — Mining Machines should be Standardized as much as possible — Mine Locomotives tie up too much Capital for Spare Parts if their Spare Parts are not Interchangeable — Modern Manager must be Awake to these Ideas — Check up on Stocks — Higher-ups are also Anxious for Reduced Costs — Questions 81

MINE MANAGEMENT

LESSON I

In the operation of all enterprises there are workmen. These workmen are divided into several different classes, and perform work along many different lines. Some workmen are known in coal mines as trappers, drivers, motormen, spraggers, timbermen, rockmen, pumpers, engineers, section bosses, firemen, deputies' overmen, underground managers, outside superintendents, managers, etc., and in this treatise the work of the mine manager is specially considered, as the work underground in the other classes of work is usually performed by men who have served an apprenticeship and have become expert in their lines.

The superintendent or mine manager is the man who represents the company at the mines, and it becomes necessary for him to acquaint himself with as many of the details connected with the operation as it is possible for him to do.

After his appointment as mine manager great care should be exercised by him lest he provoke the ill will of the employees at the outset, therefore his start goes a long way toward his subsequent success in mine management.

Starting right is a great help toward the successful management of any business enterprise. As is known by all ambitious mine workers, the young man or student of the mines has a wishful eye cast towards the jobs higher up, and the young men who are now "mine managers in the making" realize the necessity of education along managerial lines, but the sources of information for further advancement than they can get by observation are so few and so remote that it is really a hardship for the student to even get the generalities of mine management without actually performing the work.

In order to get this experience the student generally starts to work in the mines at an early age, say fourteen years, works as a helper with his father, generally at the face of the works, and continues at this work until he is of legal age to be permitted to submit to an examination before the state board of mine examiners. This examination has for its purpose the desire to ascertain the knowledge of mines and mining possessed by the applicant, as well as the conservation of the properties of the operators and the safeguarding of the lives and health of the employees.

From this examination if the applicant discloses the fact that he has knowledge of mines and mining of a standard as required by the examining board, he is granted a certificate of competency which permits him legally to have charge as fireman, assistant underground manager, underground manager, etc. At this point it should be thoroughly understood by the student that this certificate DOES NOT CLAIM THE HOLDER IS A FIRST-CLASS UNDERGROUND MANAGER, OR A FIRST-CLASS FIREMAN, but merely shows the holder has THE LEGAL QUALIFICATIONS, but there is a vast difference between being " legally competent " and " managerially competent."

In order to fill the offices of mine staff such as superintendents, managers, etc., there are few " legal requirements " and few state examinations, and on this account many of the ambitious men strive hard to get these positions without possessing much knowledge of the mines, and in turn this usually causes an under-rating of the manager in the under-manager's eyes, and also in the workmen's minds, which decision is very expensive to the employer from several standpoints.

When this feeling manifests itself visibly before the superintendent or mine manager, he retaliates or " comes back " with an order for the under-manager to appear before him and an explanation is demanded. In almost all cases where the under-manager is called upon to appear before the manager, regardless of the evidence given in the matter, there is then born a spirit of mistrust, and no matter what the foreman may do, the full and complete confidence which the mine staff should have in each other is destroyed, and this confidence is replaced by an attitude of " watchful waiting " by both parties, and the real work of both mine staffs is lost sight of.

Their efficiency toward their employer is lost sight of, results of workmen, time, expenditures of money, conservation of material, all come in for a share of partial neglect, and in the end the company must pay the bills by increased cost of product.

Too many of the young men, immediately upon being appointed managers assume an attitude of superiority over the other employees in such a manner not justified by the facts in the case, and on many occasions supersede the underground manager in the direction of a piece of work under construction, some to show their authority, some to expedite the work, some because of their nervous make-up imagine the work is going too slow, and others because their ideas of works management differ from other successful mine managers, making the subject of mine management a complex subject for teaching.

In the mine manager's relations to his under officials he should be a broad guage man, should overlook small matters, allowing the heads of departments where they originate to settle these minor affairs, and rather than assume direct command of operations personally, HE SHOULD ACT MOSTLY IN AN ADVISORY CAPACITY.

In order to best accomplish this feature he should have frequent meetings with his lieutenants, and discuss the work, welfare problems, etc., WITH A CONSTRUCTIVE, HELPFUL DESIRE and be very careful his attitude in discussion should not be interpreted as being an act of destructive criticism.

Much good can be accomplished if the mine manager can make his lieutenants feel that they could " reach him " on any topic connected with the successful operation of the works, or on any topic which might be thought best for the operation.

In this connection a good feeling can be established by the mine manager between himself and his under-managers or advisers, by his judicious language as set forth in his letter calling a meeting.

A letter announcing the meeting leaving the recipient in extreme doubt as to why it was called, what it was for and what results would be expected is far from effective ; another letter announcing the meeting saying the costs were entirely too high, or the work was not performed as expeditiously as

had been expected and that " something must be done " does not get the desired results. Nevertheless some mine managers stick to the idea that putting " the fear of God " in the hearts of their under-officials makes them more energetic, more alive to what is going on around them, etc., etc., and in addition helps to keep the foreman in a secondary stage of advancement. The letter following is a sample of some superintendents' style.

BLACK CHUNK COAL COMPANY

Colliery Manager's Office

January 1, 1921

JAMES W. ROBERT:

I am much annoyed and distressed by the receipt of a letter from the President of the company to-day, and am therefore calling a meeting at 7.30 P.M. to-day in my office.

Please be there promptly.

Respectfully,

C. H. FOUR.

Manager.

A mine under-manager and any other of the staff receiving such a letter as above would be at a loss to know what was the matter, whether the costs were too high, whether the output was too low, whether there were not enough houses to house the workmen, whether the places of worship were inadequate, or whether the ladies' aid society had stepped over the head of the manager and had written a letter to the President asking permission to use the vacant room next to the doctor's office for a meeting room for their society. Either of these reasons would occupy the thoughts of the under-manager the rest of the day as he would be thinking " what to say " at the meeting and the work of getting out coal that day would have to go unsupervised as a result.

Another sample is shown as follows:

BLACK CHUNK COAL COMPANY

Manager's Office

January 1, 1721

JAMES W. ROBERT,

Underground Manager.

I can't understand why the coal should cost so much during the past month. It seems to me, that with the amount of equipment I have gotten you, that you should have done much better. This condition of affairs will not be tolerated, and something must be done.

Report at my office to-night at 7.30 P.M. *for a meeting.*

C. H. FOUR, *Manager.*

In the foregoing letter it would seem that all the reasons why the cost of coal was high is resting on the shoulders of the underground manager, or at least the manager would so infer from his letter. The receipt of this letter "peeves" the under-manager, and he loads up with reasons which cause high costs, which he tries to prove were brought about by the manager not doing some of the things he should have done, according to the way the manager had viewed it.

Following this the manager is not pleased with the remarks of the under-manager, a breach in ethics is charged, one or the other (usually the under-manager) resigns, a change is made with its subsequent costly procedure, a new man comes, the people do not take kindly to him at first, but after a couple of years the people get to know him and he gets to know the workmen and things move along pretty well, but all the time this was going on, the company was paying the bill.

Some managers who have decided that their under-managers work WITH THEM and not FOR THEM write different letters, a sample following.

WORK TOGETHER COAL COMPANY

Manager's Office

January 1, 1921

JAMES W. ROBERT,

Underground Manager.

During the last month, Jim, our costs have run very high, in which of course we are all interested. I don't know whether or not this can be bettered at this time, but at any rate I'd like to have you at a meeting at my office this evening at 7.30 P.M., *at which time the other department heads will be present, for the purpose of ascertaining whether or not, in our judgment, a scheme can be worked out successfully to eliminate part of this cost without sacrificing health or quality of product.*

Think it over, Jim, and come prepared to give me assistance in this problem.

At this opportunity let me congratulate you on the job you performed yesterday ; it was fine.

Very truly yours,

C. H. FOUR, *Manager.*

The foregoing letter conveys first the thought that the underground manager or assistant under-manager was part of the management ; second, it conveys the fact that the manager assumed part of the responsibility for the high costs ; third, it has a tone of friendliness and is not so " stiff " as the regular stereotyped style of writing.

It also conveys the idea what the meeting was called for, what to prepare to talk about, and also a doubt as to whether or not the high costs could have been avoided, without sacrificing something, which was not the desire of the manager.

There is much importance attached to the tone of a letter received by a working official, who has not had much scholastic training, and less English in his school days, so that the letter that has a touch of personal interest in it goes a long way to prolong friendly relations, without which efficiency and costs must suffer.

QUESTIONS

1. *Describe in a brief way the advantages to be gained by giving careful attention to the start of a piece of work.*
2. *Write a description, as you see it, of the essential qualifications of a good mine manager.*
3. *What do the mining laws of your state require of a mine manager?*
4. *In the lesson what is meant by "he should act mostly in an advisory capacity?"*
5. *If you were a mine manager and had several assistant under-managers employed, state numerically what ideas you would discuss with them in a meeting you had called for that purpose.*
6. *Write a letter showing how you would notify the under-foremen of a meeting, and what problems would likely be discussed.*
7. *What is meant in the text by "and he should discuss the work with a constructive, helpful desire?"*
8. *If a man possessed a foreman's or under-manager's certificate, would it be proof that he was a good mine manager? If not, what other proof would you require?*
9. *Should the mine manager know anything about the legal duties of an under-manager and foreman? State fully.*
10. *When mine staffs become distrustful of each other, is it profitable or expensive to the employer? State fully.*

LESSON II

UNDER-MANAGERS as a rule do not get sufficient encouragement in the manner of meeting their problems, and as there is much to be gained in advising one with the other, due to the different angles from which each man views the problem, the superintendent should without fail *give visible encouragement to his lieutenants to come to him with their problems.*

The manager should not only give this visible encouragement, but he should also give a sympathetic ear to the troublesome problems of the " mine worker " which are best understood by saying, " A CHILD'S TROUBLES ARE AS LARGE TO THE CHILD, AS THE COMPLEX PROBLEMS OF COSTS, ETC., ARE TO THE MANAGER."

In the foregoing it should be clearly understood that the manager should not encourage the rank and file of the employees to " go over the heads " of their respective under-managers and come to him with problems that affect their daily work, but rather should try to get the idea to the workmen that their problems can reach him through proper channels that are well defined. If this is done in a manner that is diplomatic, a very delicate problem in mine management is solved.

When diplomacy and tact are not employed, where the utmost confidence in each other is not enjoyed, the manner of getting the workmen's and under-manager's problems to the manager or mine-manager is a very complex situation to handle, and a failure in this usually results in a change in the official staff.

It will be seen that co-operation, confidence, good-will and the constructive ability of all concerned are very essential to the successful management of the works. Without this no business enterprise can exist, and sooner or later must cease to exist, because it is unprofitable to continue the business.

It would then seem that the manager should be of a broad gage calibre, and be able to handle problems with care and with as much speed as is consistent with the problem involved, giving due consideration to all phases of the problem, so that each person interested will be satisfied, thereby avoiding the necessity of making changes in the staff. It has been determined by experience that *it is much easier to educate an official to meet your expectations than hire a new boss.*

In the constant changing of mine officials the following facts have been determined, because :

1. Frequent changes are very expensive.
2. They take up entirely too much time of the superintendent to instruct the new staff officer.
3. The workmen must conform to the expectations of the new official, which is not always easy or desirable to the workmen.
4. The new official is not always 100 per cent. efficient. It takes him a long time to reach this standard, and until it is reached he is in a measure expensive to the company.
5. This inefficiency period varies in proportion to the ramifications of the works ; that is, if the works extend over a large area, it takes him longer to become acquainted with all details.
6. It has been scientifically deducted that changing men (termed labour turnover) is quite a factor in figuring ultimate costs.

In the foregoing six reasons against constant changing of mine officials it can be said they apply with equal force in the constant changing of workmen as well, but one or two workmen changing is not as expensive as changing the official.

It must not be understood by the student that changing of workmen and officials never becomes necessary, because such is not the facts in the case. A company, corporation, or group of workmen cannot remain for ever in a healthy state, physically and financially, without some changes or some " labour turnover," but just how much this " turnover " should be, per thousand employees, is for each company's own determination.

If no changes were made, both sides, the officials and employees alike, would become fossilized, their methods would

become obsolete, their energies become lessened, and finally they would not be able to withstand the storm of competition and would finally collapse, thus it will be plainly seen by the student that there must of necessity be a happy medium somewhere, where the labour turnover is at its lowest cost consistent with keeping up the standards of the health, ages, and abilities of the workmen and finished products, and it can be emphatically declared that it is absolutely impossible to avoid total abolition of changing workmen, if a perpetuity of the business is desired.

This has become an alarming problem with employment managers, the men who are charged with the keeping of working personnel up to a normal standard at all times, so that it can be safely said, and let me repeat it, the problem of labour turnover is an individual problem, differing considerably in all branches of labour, thereby requiring individual remedies best adapted to the needs of the individual industry ; but in all industries alike it has been found that labour changing or labour turnover, due to voluntary or compulsory reasons—by strikes, lock-outs or other causes—has added much to the costs of the finished products, thereby warranting much investigation and research, with a view of lessening this cost.

Let us take for example the following :

If the cost of labour turnover per unskilled workman in the mines is from £10 to £30, it can readily be seen that the cost of hiring an official for the mines is necessarily much larger, and it has been said that it costs from £400 to £1,000 to change an under-manager, the amount depending among other things upon the ramifications of the works and the responsibility invested in the new official.

Here, then, it will be seen that it is not only expensive to change men and officials, but in most cases it is undesirable from an economical, financial and social standpoint, as the changing of the official reaches even into the household of the mine worker and creates a feeling of unrest until such time as the workmen have decided the new boss is " going to stay." This is or should be sufficient proof that without the co-operation and utmost confidence in each other, desired results in the way of production cannot be obtained and must suffer.

No workman, no matter what his position in the wheel of ndustry is, can be 100 per cent. efficient if his mind is on other

things than the work he is doing ; and it is a logical conclusion that a discontented workman, a workman worried either by industrial troubles or domestic troubles, cannot give the best there is in him while his mind is distracted along lines that are unproductive in measuring up his day's results.

At this point a few words of encouragement and assurance from the manager personally to the under-manager, will be productive of much good, both in the workman's family and in his services to his employers, which without a doubt does pay back in £ s. d. more than the value of the time it took to speak the few words of encouragement.

The problem of hiring and firing employees in and about the mines was formerly solved by the individual in charge of the job being performed, regardless of any merits in the case. The " unlucky " one had no redress whatever, and even now considerable of this responsibility is placed upon the shoulders of the under-manager, who claims the results are " up to him " and he, like any other craftsman, should be allowed to use the instruments of his own choosing to do the work well and satisfactorily.

The firemen, however, are gradually being hired by the manager, as is also the bulk of the workmen in small plants, where an employment manager is not employed.

The employment manager has come to stay. Regardless of the opinions held by mine officials of the old school, who do not look upon this innovation with favour, much good can be accomplished, from a humane standpoint, by an employment manager who is a free lance and not bound by " obligations " to any side of the question.

It has been said by some workmen where this method was practiced, and where a workman's work was not satisfactory, that, after being called to account for it, a conversation something after the following took place :

Boss : Sam, your work is not just as good as I would like to have it ; won't you try and turn out a better day's work ?

Sam : You're always complaining about my work, but thank goodness there's one good thing about this place ; no matter whether my work is good or bad, you didn't hire me and you can't discharge me.

Boss : It's true I didn't hire you, and it's true I can't discharge you, but it is also true I can make it so miserable for you while you are here, that you will wish I did have the power to discharge you.

With the coming of labour unions, collective bargaining, and industrial representation, the employment of workmen is a complex problem. Where the company's operations are large, this authority is well delegated to a specialist or employment manager, who can analyze situations more clearly, due to the fact that he makes this one phase of business his speciality. He has nothing else to divert his mind, whereas the working manager has many details of operation claiming his immediate attention and of course is not as efficient as when looked after by the employment manager.

QUESTIONS

1. *Why are frequent changes in workmen and under-managers undesirable?*
2. *What is meant by "visible encouragement"?*
3. *What do you understand by "labour turnover"?*
4. *Is labour turnover in mines necessary? Answer fully, giving reasons for your answer.*
5. *What is meant by employees "going over the heads" of their under-manager? Write an example.*
6. *As you see it, what items should be figured in the cost of labour turnover? Explain fully.*
7. *How would you reduce this cost?*
8. *In hiring new men for the mines, is there any definite time set as to the period they are expensive or profitable?*
9. *Write your ideas briefly as to whether the employment of new men should be done by the under-manager or an employment manager.*
10. *If a workman's mind is away from his work and he receives an injury, show in what way this affects production, mine production costs and compensation rates.*

LESSON III

In order to obtain the maximum of efficiency in any undertaking, it is good business to employ the very best information available to accomplish this end. In mine management the very best help available should be procured by the colliery manager, especially when it comes to employing an under-manager, as the under-manager is the colliery manager's most effectual instrument.

The colliery manager should invite the under-manager to sit in managerial conferences with him, especially when these conferences are with the manager, vice-president, etc.; this would show the under-manager something that he ever rarely imagines, namely: that the colliery manager has an officer to report to, and is under the same inspection and judgment from the higher officials as is the under-manager under the inspection and judgment of the colliery manager.

In matters of local interest, or matters pertaining directly to the operation of the mine, the under-manager should be allowed to invite the firemen, under-firemen, etc., such as boss haulers, boss motormen, boss trackmen, boss timbermen, to the conference with the colliery manager, and the colliery manager would then get information first hand instead of in a secondary manner.

It is usually the custom for the engineering department to be the medium of exchange or communication between the under-manager and the colliery manager, especially in the exchange of ideas relative to matters of finance, economy and methods of operation. THIS SYSTEM IS WRONG.

If the colliery manager knew more of the traits and ideas of the under-manager, if he knew more about the details of his work, and the circumstances surrounding his action in disposing of the several problems that come up in the mine daily, which he could get by seeing his under-manager daily and PERSONALLY, many misunderstandings between under-

manager and colliery manager would be very agreeably settled, and oftener avoided, making it unnecessary for any later settlement.

The casual visitor to the mine workings, making a visit once a week, or perhaps once a month, cannot interpret in their proper light the actions of the under-manager in performing some piece of work, as the reason for doing, the proof and all other evidence has been buried by a fall that has occurred since the last visit of the person whose duty it was to make these periodical inspections, and because of this makeshift system the under-manager usually suffers.

These "cut and dried" systems, which are not flexible, but which are employed by some engineers, are not good engineering practice. They defeat the purpose for which they were intended; and, like any other practice that causes labour unrest, whether it is between officials or between workmen, should give way to a more harmonious system in which all persons concerned could participate. This would solve the estrangement between the mine operation staff of officials and the engineering staff. It is well known that mine firemen and under-managers do not look with maximum favour upon the expected visit of the engineers, viewers, or whoever might be delegated to make these periodical inspections and subsequent reports.

It would seem that this system is wrong, as what has been done and passed over in the mine cannot be undone, and only forms a basis upon which to build future actions or efforts. Therefore it is more logical to offer constructive advice beforehand, than criticism afterwards, the one system having a chance to avoid mistakes, the other only complaining after the mistake has been made, and offers nothing corrective or helpful at all.

There are numerous instances when the co-operation between the mine officials, such as the under-manager, fireman, and the mine office, and especially the bookkeeper or office clerk, becomes strained, and the colliery manager can be of very valuable service in these matters. This near-break always is productive of very bad after effects, and the colliery manager should strain his efforts to keep constantly a harmonious feeling between these departments, as they are the ones upon which the colliery manager depends for his facts and figures

as to costs, etc. The office force cannot get these worked up into desirable shape unless the under-manager gives his account of day labour, yardage, tonnage, etc., in good shape, and on time. This is especially necessary where credit for work from the mine is reported to the supply store where the workman trades, and many delicate situations arise from the fact that a workman's credit is not reported to the store on time.

The under-manager usually is a "man of the mines" not accustomed to reasoning out fine calibres, and when called upon to make reports, does not look with favour upon this innovation, as he terms it, and says, "THERE IS TOO MUCH RED TAPE CONNECTED WITH THIS JOB," so I'm going to quit. Here he becomes indiscreet and then adds to this, "I'M HERE TO MINE COAL AND NOT MATHEMATICS." The firemen and staff hear him, and in a short while they commence to grumble and complain. A bad feeling is created all down through the ranks, and the company pays for it in the shape of lost tonnage. Some of the men leave the works and move elsewhere to avoid any unpleasantness that may arise from a well-developed "imaginary grievance," and this unpleasantness is usually called a strike, lock-out, walk-out, or some other name known in mining parlance, which means simply that the work is stopped temporarily, and this stoppage is usually expensive to all parties, interested and disinterested alike, and makes it absolutely impossible to figure out where the long and dangerous arm of the strike can and does reach. This feature alone should teach the mine under-manager, under-official or workman that it pays in real £ s. d. to be very discreet and cautious in conversations relative to terms and provisions of employment.

THE UNDER-MANAGER SHOULD KNOW HIS DAILY COSTS MINUS THE OVERHEAD CHARGES. He can get this information by co-operating with the colliery-manager or with the office force and this information is just as much an instrument in the under-manager's hands as it is in the colliery manager's hands, therefore the under-manager should look with favour upon the idea of daily approximate costs, without which he cannot keep abreast of the requirements of a successful under-manager, as is expected by modern companies.

It is too often the case where the under-manager divorces himself from the presence of the superintendent for entirely

too long intervals, thinking and giving way to the erroneous idea that the colliery manager is trying to get something "on" him. This is a mistaken idea, and in nearly all cases the colliery manager much prefers to give credit to the foreman and all others rather than to give censure. The modern colliery manager finds pleasure in giving credit, and will always acknowledge it is painful to censure any employee.

The logic deduction is here easily made that the success of the colliery manager rests largely upon his ability to co-operate with the under-manager, and this co-operation cannot be brought about by contention, censure and lack of team work; therefore utmost harmony and confidence in each other's ability to do right must prevail if maximum results in all lines of the works management are expected to be realized.

The fact that so many systems of payment for wages earned are used in coal mines, and call for a large amount of co-operation and co-ordination of results of each, makes team-work indispensable. For instance, there is (1) *Piece work*, a method where a workman is paid a certain price for loading one car, or for making a certain amount of excavation he is paid a piece-work rate, miners usually calling it yardage rates; (2) *Day work*, where workmen are paid a stipulated sum regardless of the amount of units of work performed, and (3) *Tonnage rates*, a method whereby workmen are paid a certain sum of money for every ton of product they load, or perhaps undercut, or perhaps shoot down, all of which go to make up and measure the success of the colliery manager, as he is judged by the way in which he handles the problem.

Maximum results in all lines of mine management depend largely on the ability of the colliery manager to build up his organization. In the building of this organization he must of necessity have men that can meet and discuss problems scientifically, especially when under fire of legal questioning and when interviewed by the business men composing the stockholders of the company.

He must also get men technically educated along the lines of handling men, men with a knowledge of steam engines, boilers, pumps, compressors, etc.; men educated along lines of bookkeeping and the handling of figures, and last, but by no means the least, he depends very largely upon the education and science of the college trained man in engineering lines.

The building up of his staff for permanence is quite a problem of the colliery manager, as he has no assurance of permanency or tenure of service from the men of his picked organization, and this should rightfully be the case, as the experience the staff officer gets if he is a young man fits him for more important posts and greater responsibilities than is probable in his present position. His arm of ambition therefore for promotion is ever out and on the alert, and if it does not appear in his own company soon enough, it may appear in a new company and he leaves, thus making a hole in the organization and staff of his former employer. The amount of loss this company sustains by the departure of this man is in a measure the instrument used to measure the size of the colliery manager.

If he has been " a man's size " in managing his works, he will have seen there was in all departments an understudy, so that the death or other reason for a break in the ranks from any cause would have no visible effect upon the future results of the plant. Of course if this has not been done, in many cases it would be like losing the right arm of the business for quite a while, until the new man could be brought up to a point of efficiency the old one had attained before leaving.

In building up the engineering staff, great confidence and responsibility must be delegated to this arm of the management, and it has often been argued that all things being considered the man of age gives the best results. This, however, has always been a question of doubt. The ideal engineering staff seems to be when men of youth get the information of men of age to work with.

Men of age, and rightly too, are more stable and reliable than the younger class. It is among the younger class we see pointed out the college men who do not make good and this class of failure is used as a point against the college trained engineer, I mean engineer in all that the term implies, not merely a surveyor or transit man who gets the data for the real engineer to work with.

There can be much trouble and anxiety avoided by the colliery manager if when building up his staff he will make a few inquiries as to the life the engineer was used to before taking his college training.

If he was from a mining community, not necessarily from parents engaged in mining, he has more changes to make good

than the college man who just dreamed he would make a mining engineer for the romance of the thing. The college man who comes direct from the atmosphere of the mining community does not come for any romance, as he knows first hand just what to expect in mining communities, just what living conditions are, just what associations he will have personally, and just what amount of culture and refinement he may expect. He therefore is not disappointed, and usually stays there his allotted time. This shows the good choosing qualities of the colliery manager and the good staying qualities of the engineer, he in turn reflecting credit upon himself and the institution which graduated him as a sample of its product.

It will thus be seen that it is necessary to know quite a good deal more of the engineering applicant than, Can you run a survey? Can you make working plans of a tipple? Can you project a mine map? It is needless to say then, that the present-day colliery manager is taking a wide angle view of the members of his staff before giving them an engagement with his company.

QUESTIONS

1. *Do you approve of periodical meetings with the mine officials?*
2. *Name any advantages or disadvantages you know in this policy.*
3. *Are there any advantages gained by the colliery manager seeing the under-manager daily? If so, name them.*
4. *Do you think the under-manager should know approximately his daily costs of operation?*
5. *Would you prefer a monthly cost sheet in preference to a daily one; if not, why not?*
6. *What is meant by a strike, lock-out, walk-out?*
7. *In the adjustment of labour controversies what is meant by "collective bargaining"?*
8. *What is meant by piece-work, day-work, and tonnage-rates?*
9. *Name an operation that is paid by*
    1. *piece-work.*
    2. *day-work.*
    3. *tonnage-rates.*
10. *How would you guard against the probable ill feeling of the under-manager following a request of him to furnish a report of operations daily?*

LESSON IV

THE colliery manager, in order to keep in touch with all conditions around the mines, both inside and outside, resorts to the use of a daily report. Following is a report that, though brief, can be elaborated upon and made to suit individual cases.

UNDER-MANAGER'S DAILY REPORT. *January* 1

Tons or cars out.....3,560 tons
Delays outside.....55 *minutes*
Delays inside.....1 *hour*, 10 *minutes*
Delays inside by " breakdown " or " fall " ..*By fall*, 30 *minutes*
by breakdown, 40 *minutes*
Was any machinery damaged?.....*No*
Was gas discovered in any new location?..*Gas was discovered for the first time on falls in 14th North pillars*
When did you order important supplies not received?
Ordered brattice cloth Req. 572—*Dec.* 14
What places were finished and measured up to-day?
1–2–3–4 *Stalls, 3d South*

IMPORTANT

MAKE A REPORT OF ALL PERSONAL INJURIES TO WORKMEN TO-DAY, SERIOUS AND NON-SERIOUS.....*None reported and none observed.*

NOTE.—*After finishing his day's work, George Thomas, married, driver, age 29, was taking his horse out of the stable, when he tramped on a nail which penetrated his right foot. Dr. Relief attended him. Further details on separate accident blank to-morrow. This accident was not caused until after he had finished his work and reported out and safe. He will probably be off work two weeks.*

Signed *A. M. Careful,*
Under-manager.

Tonnage sheet showing comparision of daily costs June and July

Date	Coal tubs out		Tonnage		£ s. d.		Cost per ton		Average wt. per tub in lbs.		Tubs of rock out	
July	Last mo.	This mo.	Last mo.	This mo.	Last mo.	This mo.	Last mo.	This mo.	Last mo.	This mo.	Last mo.	This mo.
					£	£						
1	3570	3617	7140	7234	1305	1328	3/7/6	3/7/2	4000	3900	340	1400
2	4570	4600	8167	8230	1508	1530	3/8/1	3/8/8	3997	3920	576	1489
3												
4												

NOTE.—The under-manager takes his base of costs from the daily time book that he turns into the office each day; he adds the amount each day to the amount already accrued during the month; he adds the tonnage of the day to that already put out during the month, and divides the costs accrued into the tonnage obtained, and gets approximate costs. He does not need to take into consideration for this report the outside costs, or the overhead costs, as they are about stationary and do not vary much.

The increase or the decrease in costs is usually brought about by the percentage of day labour increasing, or the tonnage dropping while the day workmen remain the same.

While the report from an accountant's standpoint is very crude and primitive, yet it has been found to be a preventive against unnoticed rising costs, if given the consideration it warrants. All mine managers recognize immediately that a cost sheet delivered two weeks after the close of the month's work showing the unpleasant things, such as low tonnage, rising costs, greater overhead expenses, does not perform the function as they (the colliery managers) would like to have it.

What is wanted is a sheet that will give a "warning" of rising costs. It is far more effective than a sheet showing the "rising costs" had actually occurred.

If this is kept right, and the under-manager enlists the sincere thought of the foreman to its findings, the under-manager will soon become an ardent admirer of the sheet, which will reflect itself in more stable costs in all departments.

" Irregular " or " part time " operation of the mine is a most prolific source of rising costs at coal mines, and one requiring great skill and diplomacy on the part of the foreman to keep pace with, if he wishes to hold his place as a labour cost analyst.

For instance, if fifty day men are employed regularly at a mine to keep it in operation six days a week, and if for some reason, holidays, shortage of railroad, trucks, or any other cause, the mine can work only part days—say three days it works five hours per day and closes down, and three days it works three hours per day and closes down—the temptation and pressure brought to bear on the foreman to employ the day men six full days is almost more than he can meet. Consequently the trackmen are kept after the mine has quit hoisting coal to " clean up " etc., etc., the timbermen are kept to deliver timber so as to have them in another place, the drivers are kept to haul this material, etc., etc., all of which would have been done by workmen in their regular routine, if the mine had worked six full days. From this it can be seen the costs accruing from working the trackmen, timbermen and drivers three hours per day for three days, and five hours per day for three days, are very high. This class of workmen working twenty-four hours per week when the production of coal has stopped greatly increases the cost of former production.

It will thus be seen that in order to keep steady costs, day work must cease as near as possible when or after the mine has quit producing coal over the dump.

Let us take report No. 1 and look it over ; here we find, " Tons or number of tubs out." The under-manager or the colliery manager can see at a glance whether or not the normal number of tubs has been produced for the day. If there has not been the regular amount of tubs produced there should be a reason.

If the second item, " Delays outside," should have a notation of fifty-five minutes delay or any amount of delay, the colliery manager may be able to provide means whereby these delays outside can be prevented. If as the report shows, the delays on the inside were one hour and ten minutes and are due to falls of rock, etc., perhaps by a small appropriation this also can be remedied ; therefore this information is exceedingly

necessary to the successful management of the mine, and not "red tape" as it is often termed.

In the fifth item, "Has any machinery been damaged?" this report, properly filled, will give the colliery manager a chance to look over the stock of repair parts or spares, and if there are none on hand they can be ordered without delay. This also gives the under-manager a chance to report a damaged piece of machinery followed or accompanied by a requisition for duplicate parts, and avoids the risk of delays due to the under manager forgetting to order the parts.

The discovery of gas in new places is very important as the quantities discovered soon make known the fact that additional ventilation to dilute it must be provided to keep the mine safe, even when the number of workmen employed does not increase.

Although the discovery of gas or firedamp is commonplace in many mines, and is looked at as a regular occurrence, yet the discovery of firedamp or gas in new locations is very significant, and carries with it warnings not to be underestimated, both from a safety standpoint and from a financial reasoning.

If the mining laws have provided that a certain number of cubic feet of pure air be furnished per minute per employee or animal, or if the laws require, and rightly too, that this quantity shall have a certain standard as to quality, then the discovery of new places generating methane or firedamp must have attention.

Let us take a plain example. If the returns in this particular mine contain one per cent. of Methane, and this amount is the highest amount allowed by law, the other 99 per cent. is generally composed of Oxygen, Nitrogen, Carbon Dioxide, and other gases in small percentages, but the fact remains the same: there are 99 parts of air to one part of gas. Now suppose there were several new places making gas, and in such quantities as to raise the percentage up to two per cent. methane in the returns, it would mean the quantity of air produced by the fan would have to be doubled, and to double the quantity the power would have to be increased eight times; therefore, after taking first into consideration the safety of the workmen and property, the increased cost for power will be eight times the former amount, this being a point of great importance in mine management.

It therefore follows that the modern colliery manager should be very particular with the three laws of friction, which are as follows :

1. The pressure required to overcome friction varies directly as the rubbing surface.
2. The pressure per unit area required to overcome friction varies inversely as the sectional area of the airway.
3. The pressure required to overcome friction varies directly as the velocity squared.

From the third law it follows that the pressure varies directly as the quantity squared, and the power varies as the quantity cubed. For example if the quantity is doubled, the pressure will be four times as great, and as there is double the quantity at four times the pressure, the power required will be eight times.

The next item, " Did you order any important supplies that were not received ? " is very important, as it relieves the under-manager of the blame for not ordering or reporting, and it keeps the colliery manager posted as to whether the purchasing agent is still trying to make the purchase for early delivery, or whether the item has been overlooked, or perhaps lost in transit.

The next item, " What places were finished and measured to-day ? " is very important, as the colliery manager can see on his office map whether or not the volume of tonnage can be expected to keep up regular, or whether in a short time it will have to fall, due to the inability of starting new stalls, on account of not enough entry being held or maintained in reserve. If development work is not kept up to its proper proportion against the producing entries, the tonnage will surely fall.

If a book is kept of the distances stalls are driven up, when the quarterly survey is made, probably a month after the place is finished, the engineers will be able to get accurate figures from the under-manager as to the distance the excavation was made or the location where the pillar was broken for excavation, and where pillar drawing was commenced.

The last item, " The report of personal injuries to workmen," is very important, as the outcome of the injuries is at all times very uncertain, and the compensation rates of insurance against that particular mine are largely governed by

the number of accidents occurring and the length of time compensation is paid to the injured workmen. For this it will be seen that the least number of accidents, with the least loss of time, is best for both employer, employee and under-manager. It reflects credit upon the management of the property, and sets forth boldly that his judgment in prosecuting work with maximum safety to employees was very well worked out.

In the latter part of the report it will be noticed that a workman was injured " after he had ceased to perform the work he was hired to do." In this particular case George Thomas was employed to drive a horse in this mine, and as he lived a considerable distance from the mine, he used a riding horse to get to and from work.

The company's representative, in order to be agreeable, and to make conditions as agreeable and convenient as possible for the workmen, allowed this driver to stable his horse in the company barn. For some reason or other this driver in getting his horse outside had to step over a wooden peg used to hang harness on, and which had been overloaded and pulled off the wall. In doing this he stepped on a nail and received the above injury.

In this particular case, the under-manager or whoever was charged with the reports of accidents, was at a loss to know whether or not to report this accident, as it had happened after the employee had checked out of service. To be on the safe side and not take any chances, the foreman got as much data as he could, reported it, and thereby passed up the responsibility for action, legal and otherwise, to the person he reported to, thereby absolving himself from any neglect which might in the future be charged to him, especially if the injury developed into blood poison with a loss of a foot or leg to the employee.

This again emphasizes the slogan " TAKE NO CHANCES,' and holds good in your business, in your work, and in your everyday life.

The fact that this employee had checked out would no doubt cause some intense inquiry on the part of the claim agent of the insurance company or the agent of the compensation commission as to whether or not this accident came within the scope of the protection of the policy under which he was protected, and in the event nothing of record was kept by the

company of this accident, it might develop into some very annoying and painful circumstances.

In analyzing Report No. 2, it will be noticed the report is a comparative statement made daily of the figures of the current month and the figures of the preceeding month. Sometimes, after a good day's run, the fact that previous days were not so good is lost sight of, and the fact that the record was broken gives a false idea of tonnage costs; therefore it is not the "big days" that lower costs and give maximum monthly tonnages, but a steady constant stream of "a little above the average" results that count in the long run.

Sometimes the under-manager thinks a new man should be put on temporarily at say £1 per day, and uses him for a time but fails to put him off after the task is completed. If the mine is working only part time, and the "non-producing" day men are kept regularly employed after production ceases, and if many more instances peculiar to every individual mine which develop mine costs, are not kept constantly before the eyes of the colliery manager by means of daily cost sheets, he is wholly unable to even guess with any degree of accuracy the comparative cost of output this month as against the cost for the last month, or against the cost of any month preceding. This report can be elaborated upon to suit every condition about the mine that involves costs. Average weight of tubs, percentage of rock to coal produced, are interesting to know, from which can be ascertained whether or not the tubs are being loaded to their capacity, which is vital in a mine with long hauls. From the amount of rock tubs being hauled outside, a determination can be made as to the cost of this work, with a view of employing some other method of rock disposal.

Perhaps after figuring on the time the tubs were in rock service, the cost of power and labour in haulage, the damage from excessive weight in motion on the mine tubs, and the loss of coal due to many tubs being tied up in rock service, it would be much cheaper to unload the tubs in the gobs in abandoned and worked-out places, keeping them always within the mine, making them available quicker for coal service.

It would seem there is room for improvement in the handling and disposal of rock and refuse from the mines, especially where the mines have long haulages, or are situated where

the disposal dumps must be provided in a place where land is very scarce and where available sites are hard to get.

A hard and fast rule tending to show the proper place for the disposal of the mine refuse is very hard to make, due to the fact that no two coal mines have exactly the same conditions to contend with, therefore at each mine methods should be worked out that would best suit each individual condition. This is especially true where coal mines are within the limits of city boundaries, or along navigable streams where this refuse might be washed into the channel and close it.

To the ambitious man, these reports are not "red tape," as is commonly implied by the term, but certain information very essential to efficient operation of the mine, and cannot be construed in any reasonable sense as detrimental to workmen, foremen or company. In fact by following or inaugurating this system there is all to gain and nothing to lose.

QUESTIONS

1. *Make out a report like Report No. 1, filling in an assumed condition.*
2. *Make out a form like Report No. 2, adding any other features that you think a colliery manager ought to know.*
3. *What are some of the reasons for periodical high costs?*
4. *How can it be ascertained whether or not the tube from the mine are loaded as full this month as they were last month?*
5. *Suppose there were hauled this month 3.570 tubs and the tonnage this month showed the tubs to be on an average 75 pounds lighter for each tub. If there were 29.700 tubs hauled during the month, how much tonnage would be lost by underloading?*
6. *State briefly how you would proceed to remedy this condition.*
7. *State all the conditions you know that would make it necessary for the colliery manager to know all the new places generating methane.*
8. *If 150 men were working in the mine, and it was being ventilated according to law, could a condition arise which would*

necessitate doubling the quantity of air, without increasing the number of employees? If so, name the condition.

9. *Is it important that all accidents be reported?*

10. *Are you favourable or unfavourable to the use of daily reports from the under-manager to the colliery manager? State your reason for your answer.*

LESSON V

INSPECTIONS of the different branches of mining or work connected therewith are becoming as necessary to know the true condition of the mine, as costs are to figure whether the mine is being worked at a profit.

These inspections are along several lines : safety inspections by a safety inspector ; pillar inspections by expert pillar men ; conservation of material inspections by keen-sighted men ; coal inspections by men capable of seeing and knowing clean coal, and cost inspections by accountants.

All these are in addition to the numerous inspections performed by the under-managers and firemen as required by the different mining laws in different states.

As compensation rates for determining the size of the premium an operator pays for the insurance of his employees are based upon the hazards of his mine, this being determined by the amount of accidents, numbers, and time lost, it clearly shows that premium rates are lower in the mines with least accidents, and it takes but very little figuring by the colliery manager to find out that it pays handsomely to decrease the number of accidents in and about the mines, as well as doing a humane act of conserving life.

These safety inspections may be or may not be made by the company's mine inspector. They may be made by the insurance companies' inspectors, but no matter who they are delegated to, their efforts are projected to one end, namely a decrease in the amount of accidents to employees.

The safety inspector usually does not work out of the office of the mine official, but usually out of the office of the head of the company, and in a measure he is a free lance ; that is, he is not subject to the orders of the mine officials and reports directly to the head of the company or to the head office. This may or may not be the best and most effective method of procedure.

After the safety inspector has visited his territory he should make a report of unsafe practices to the colliery manager or under manager or someone in authority at the mine, for immediate remedy, if the best results are to be obtained. At some plants, however, this report of his findings is preserved until he gets into the city office and the head of the company is notified, who in turn orders certain changes or provisions made.

The outcome of this practice can best be seen in the localities where it is practiced, but has its advocates for and against.

Sometimes after a visit by the company's inspector the colliery manager gets a letter something like this :

BIG LUMP COAL COMPANY

Executive Offices

January 1

U. B. Good, Colliery Manager,
At the mines.
Dear Sir,

Upon the last visit of our inspector to your mine the following conditions were observed,:

No. 1 *Right had* 3 *inches of water on the track.*

No. 3 *Left the trap-door was dragging, causing considerable leaking of air.*

No. 4 *Right bad joint on track opposite* 13 *Road.*

No. 6 *Right a low spot in roof near the face due to clay vein.*

No. 13 *Left considerable gas was being generated near the face of the entry.*

Please have the above remedied.

Yours very truly,
President.

Often after the above letter is received it is laid aside by the colliery manager and forgotten, and the executive head has no record that the work was even examined by the mine heads.

The letter might, however, have been received with the addition of a blank form on the bottom as follows ; and this could be filled in after completion of the work and returned to the proper authority.

Items 1, 2, 3 *were made safe January* 1, 1920.
Items 4, 5, 6 *were made safe January* 3, 1920.

Signed,
A. M. Careful.

This form would have a twofold effect: first, it would keep the mine official notified of the fact that he had been ordered to do a certain piece of work; second, it would let the executive officer know his commands had been obeyed. This plan of report is good for use of the under-manager, fireman or colliery manager, and is in effect the complete history of the job named thereon.

A sample used by the under-manager is as follows:

Jim Brown,
Trackman,
Lift track 3 inches in swamp at 45 North. This I think will take it out of the water.
Report hereon when completed.
Completed January 3.
Signed, Jim Brown.

If the mine was a large one the under-manager would know that his order had been obeyed without going there personally to see. He also has a record of the date this job was done, and can figure therefrom whether anything had been gained by doing this piece of work.

Special forms should be used by the safety inspector, and his work should be confined entirely to safety practices as they affect life and property.

The pillar inspector sees that the extraction of the greatest amount of coal, with the least amount of expense consistent with safety, is maintained. He in a measure is an under-manager, helping to make the pillar work safer and more economical.

The material inspectors look for iron and wooden rails mislaid, the recovery of props, ties, etc., that remain after temporarily being used, the recovery of rails and props after they have been drawn out in pillar workings, and it is needless to say the recovery of material in large mines more than pays for the services of the inspector, especially as material becomes scarce and prices advance.

Conservation or material inspectors usually take in the inspections of the storing of material outside the mine, in the mine yard, in the stables, etc., in fact over the entire plant.

Coal inspectors see that the men clean and prepare their

coal properly in the mines, and also on the tipples and on the railroad trucks. It has been found that the addition of a coal inspector had a moral effect on the loaders as well.

The cost inspections are not as importantly noticed by the under officials, as they usually leave this to the office men and managers, but if there is a gradual rising of costs without any explanation being made, it would seem that someone should be charged with finding out the reason, and calling a conference to discuss whether or not the rising costs were permanent.

The foregoing may seem superfluous, but in effect they are just what is being done by large companies to-day, but perhaps under another name. In addition to the foregoing, there should be periodical inspections of residence properties, as well as all the buildings at the plant.

Houses should not be allowed to get into a bad condition due to neglecting furnishing repairs, neither should tenants be allowed to build additions in crude fashion to the finished and painted sides of dwellings. If the privilege is given one family to build an addition, it is very hard to deny the requests that follow from families in the immediate neighbourhood.

The outbuildings, closets, coal houses, etc., should be kept in goodshape, and this can only be done by systematic inspection and repair work at the proper time.

The agents or managers should see that all surface drains are kept open and passable for liquid at all times. He should also see that the wells for drinking are well kept and protected. Where there are hydrants installed on a water system, there is nothing so annoying to the miners' families as the fact that half of the hydrants are out of commission, making it necessary for the conveyance of water for several house lengths, and often this distance gets entirely too far.

If these conditions are not remedied as soon as possible, workmen become dissatisfied and begin to move away ; perhaps they take the matter up in their local union, and decide to stop work till these conditions are remedied. The mine closes a day or two, the company loses the profits on their daily output, but the overhead expense does not stop ; consequently the company loses both ways, and the hydrants or grievance must be remedied in the bargain ; so it can be plainly seen that a small item can cause a large expense in the

operation and management of coal mines, and making periodical inspections and quick remedies to defects are very profitable from all angles.

QUESTIONS

1. *What duties do the different inspectors generally perform around coal mines?*
2. *Explain how compensation premium rates are affected by the number of accidents.*
3. *Is the safety inspector usually under the direction of the colliery manager? If not, please give your reasons why he should or should not be.*
4. *Write a form letter of the findings of dangerous practices as you might find them when examining a mine.*
5. *Write a form for use when asking the mine official to remedy a dangerous or objectionable feature.*
6. *Write a form suitable for the under-manager to use when ordering a piece of work done in the mine, and which he cannot go and see at the time.*
7. *Who should perform the duties of material inspectors where the work would not justify paying a man for this purpose alone?*
8. *Could there be an argument causing friction between department heads by the employment of these inspectors?*
9. *Is it necessary to inspect coal for impurities at the mines?*
10. *Explain why the consumer pays double the price for dirt shipped him than for the coal shipped him.*

LESSON VI

Of late years the underground officials have partially lost sight of the quality of the output, this omission being the result of the strenuous efforts to obtain quantity.

This effort to obtain quantity, by relaxing vigilance to keep up quality, is not the only factor that enters into the standard of quality. It will be noticed elsewhere that harmonious feelings are necessary to efficient work. The teamwork and co-operation between departments have not always been at the maximum, and as stated before the works suffer ; this again shows the urgent necessity for constructive teamwork.

There are two vital factors that must be taken into consideration in every problem in works management, and must not be lost sight of for a moment. THEY ARE THE PRODUCER AND THE CONSUMER.

In order to get the maximum efficiency from the works, it is imperative that the utmost confidence be enjoyed between these two factors, so that a continuance of orders may be received from the consumer, and a continuous fulfillment of these orders by the producer. Anything that assists in making a breach of faith or confidence between these two factors works to the detriment of both, and therefore should be avoided and precautions taken to prevent it.

Service from both parties at the time and place as agreed upon, and at the price agreed upon, are two of the very best assets either party can have in order that business may go along as usual, thereby furthering their mutual interests and making it a pleasure for each factor to conduct business with the other. The service rendered in buying and selling coal is a large factor in bringing about pleasant business relations. The conditions under which coal is bought, sold and delivered are very seldom known to the mine officials.

The National Association of Purchasing Agents have

recently composed a contract form which they believe can be advantageously used for most commercial contracts for the purchase of coal, and where special conditions require special clauses these might be added to the contract.

It is carefully built to cover general conditions, and designed to prevent misunderstandings from faultily drawn agreements.

In the preparation of the proposed contract the committee of the National Association of Purchasing Agents had the guidance and advice of Mr. W. B. Symmes, Jr., of New York, formerly solicitor for the U. S. Fuel Administration.

The agreement follows :

AGREEMENT entered into this.....day of.....19...., between.....of....., hereinafter referred to as Seller, and.....of....., hereinafter referred to as Buyer.

The Seller hereby agrees to sell and deliver and the Buyer hereby agrees to purchase, between the..... day of.....19.... and the.....day of.....19...., the quantity and kind of coal and at the price hereinafter stated upon the terms and conditions herein contained, to wit :

QUANTITY ..... net tons
RATE OF SHIPMENT (approximately).....net tons per month
DESCRIPTION.....
.....
.....

Proximate Analysis :
Moisture ..... Fixed Carbon ..... Sulphur .....
Volatile Matter ..... Ash ..... B.t.u. .....
PRICE £.....per net ton of 2,000 lbs. f.o.b. cars mines.
POINT OF DELIVERY : f.o.b. cars mines.
TO BE SHIPPED TO.....
DESTINATION .....
ROUTING .....
KIND OF CARS PREFERRED.....

TERMS AND CONDITIONS

1. Invoices shall be paid on or before the.....day of each month for all coal shipped during the preceding calendar month. Non-compliance with said terms of payment shall give the Seller the right to suspend further shipments until all previous shipments are paid for, and if in the judgment of the Seller the financial responsibility of the Buyer shall at any time become impaired and written notice thereof be given by the Seller to the Buyer, the Seller shall have the right to suspend further shipments until adequate security for payment hereunder is furnished by the Buyer. If such security is not furnished within thirty days from such notice, the Seller shall have the right to cancel this agreement.

2. All settlements shall be governed by the actual railroad weights ascertained at the usual points at which railroad shipments from the mine or mines producing the coal shipped hereunder are weighed.

3. Strikes, fires or accidents at the mine or mines where the coal sold hereunder is produced, embargoes, shortage of car supply or other similar occurrences beyond the control of the operator of such mine or mines which prevent or interrupt the shipment of such coal, shall excuse Seller's failure to ship hereunder during the continuance of such occurence, *provided*

(*a*) The Seller is the owner or exclusive sales agent of the mine or mines at which the coal sold hereunder is produced or prior to or simultaneously with the execution of this agreement has entered into a written contract for the purchase of a sufficient quantity of coal from such mine or mines to fulfill the obligations of the Seller under this agreement;

(*b*) The name of the owners and location of such mine or mines is stated in this agreement;

(*c*) The Seller gives the Buyer written notice within five days after such occurrence of the exact nature, extent and probable duration thereof, with sufficient detail to enable the Buyer to verify the same;

(*d*) The total available tonnage of said mine or mines during prevention or interruption of shipments as aforesaid is applied pro rata on all contracts then in force or any renewals thereof for the output of such mine or mines exclusive of contracts or sales made after such occurrence;

(*e*) Shortage of car supply shall not excuse failure to ship hereunder if at the time of such failure there are in force contracts for the sale of more than the rated output of such mine or mines based on the car rating given such mine or mines at the date of this agreement by the railroads on which the same are located.

4. In case of strikes, fires, accidents or causes beyond the control of the Buyer which wholly or partially stop the works of the Buyer, shipments contracted for shall be suspended or partially suspended, as the case may require, upon written or telegraphic notice to the Seller.

5. If the Seller shall fail to ship or the Buyer shall fail to accept the monthly shipments herein provided for and shall be excused for such failure under Articles 3 and 4 hereof, the other party at any time after the expiration of the first three months of the contract period may, by written notice to the party who has so failed to ship or accept, reduce the monthly tonnage thereafter to be shipped and accepted hereunder to an amount equal to the average of the monthly shipments for the three months preceding such notice.

6. The purchase price of the coal specified herein is based upon present agreements with mine employees as to wages, and any increase or decrease in the cost of production of the coal shipped hereunder caused by changes in such wage agreements or by the imposition by State or Federal Statute of a direct tax on coal or the mining thereof or subsequent changes in the rate of such tax shall correspondingly increase or decrease said price of coal on any tonnage thereafter shipped hereunder and affected thereby.

7. The coal covered by this contract is to be used only in the plant or

plants of the Buyer and is not to be sold or diverted by the Buyer to other purposes without the consent of the Seller.

8. Waiver by either party of any default by the other hereunder shall not be deemed a waiver by such party or any default by the other which may thereafter occur.

9. Notice sent by telegram or registered mail, addressed to the party to whom such notice is given, at the address of such party stated in this agreement, shall be deemed sufficient written notice in any case arising under this agreement.

10. No understandings, agreements or trade customs not expressly stated herein shall be binding on the parties in the interpretation or fulfillment hereof unless such understandings, agreements, or trade customs are reduced to writing and signed by the respective parties.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed in duplicate by their respective officers duly authorized the day and year first above written.

_____Seller

By

_____Buyer

By

The relation of the under-manager to the consumer is not generally known, or at least not generally taken into consideration. If a little thought is given along this line it will be found that the relation between these two factors is vital.

At times of indifference and at times when under the heat of passion, the under-manager may say, " I'm getting coal out for the office to get rid of," or again he may say, " I don't care where it goes just so I get it out."

If the colliery manager can picture graphically to the under-manager the position he (the under-manager) would be in if placed in the consumer's shoes, he (the under-manager) would take an entirely different view of the situation.

In making an analysis of the business in a rough way, three conditions stand out prominently. They are :

1. The consumer has the money.
2. The Coal Company wants it.
3. The miner wants the work.

As all businesses are primarily run for investment, the money the consumer has is what the coal company wants, and it naturally follows with the question, " How can we get it ? " It can be gotten legitimately as follows :

1. By exchanging coal for money with the consumer.
2. By giving the consumer coal when he wants it.

3. By using the class of equipment the consumer can handle.

When it is agreed in a contract to furnish "coal for money" no matter how the language is dressed, it means *Coal.* This meaning also carries with it the fact that the coal must be clean, with the minimum amount of refuse such as, slate, bone, sulphur, or any other impurities it may possess.

The practice of smashing bone coal and slate with a sledge is a very pernicious one, and only resorted to by indifferent and inferior workmen.

When loading coal by machinery such as electric shovels, or by hand shoveling, great care should be taken to avoid getting slate from the bottom of the seam or the floor, by reason of the shovel digging into the bottom. This is especially to be guarded against where the seam overlies a soft floor.

Another source of "dirty coal" from which the miner should be excused is from the use of unclean railroad trucks; for instance trucks that have been in the trade hauling limestone, bricks, iron ore, pig iron, small castings, tile, and especially trucks that have been in the sand trade.

These trucks are not hard to clean during the summer months, but in the winter it is almost impossible to keep them as clean and free of foreign matter as is required, because the material being uncovered, it is out and exposed to the weather. Consequently during a snow storm, while the trains are in transit, small castings, bricks, broken tile, etc., are covered and frozen over, making these pieces very hard to observe by the truck cleaner; in fact it is impossible during ordinary loading procedure to keep the trucks anywhere near as free from refuse in the winter time as they can be kept in the summer time.

In the case of a truck previously loaded with sand, the sand is washed in the truck, that is, sand and water alike are run into the truck, the water draining off as best it can, and if the weather is near the zero mark in temperature, it is not uncommon for five or six inches of sand and water to be left on the bottom of the truck after unloading, with no thought or care for the service next required of this truck.

This truck is placed at the mines for coal loading during a snow storm, the cleaner scrapes it out with a shovel, perhaps sweeps it out with a broom, and as the bottom shows smooth

and level, he takes it for granted the truck is clean, when it is not.

The warm coal from the mine is dumped on this false bottom, which the cleaner has not observed. The coal melts the ice and sand and when the truck gets to the consumer, its contents are permeated with sand. This mixture when thrown into the furnaces is very unsatisfactory, in fact often hindering the heating value of the coal.

If the trucks are of a hopper type, and the doors are secured when the trucks arrive at the mine, which an inspection at the mine reveals, it is often found that the pockets are partially filled with ore, pig iron, scrap, etc., covered with snow; or if a long haul has been made by a train having these trucks in transit, the pockets are covered with cinders. Coal is later loaded upon this supposed cinders, snow, ice, etc., and the loaded truck is sent to the consumer. This material added to a stray coupling pin, a pit prop, a mine tie, a piece of iron rail, etc., drops through the hopper-door unseen. This coal and refuse are then sent into the crusher, where the coal is crushed for mechanical stokers, and results in breaking the jaws or rolls of the crusher. All these conditions have happened, and although they are not all chargeable to the neglect at the mines, they at least warn the mine manager of the necessity of careful cleaning and preparation, of the trucks first, then the coal, before shipment is made to the consumer.

It is often asked, why should the colliery manager or undermanager take any interest in the kind of equipment run on railroads, their work is to manage affairs at the mine, and just as long as they have a place to dump their coal, they need not worry as to the class and character of the equipment provided at the mines for loading.

This is a mistaken idea. It happens occasionally that some consumers can only use one class of equipment, others can use any class or all classes, and others can use one or two classes. It often happens at the mines there are several chutes to load from, but the right truck, or kind of truck, is not under the right chute.

If the colliery manager is familiar with the names of the types of the trucks as designated by the railroad upon which he is loading, it will often help him considerably, when talkin

to the purchasing or selling agent, explaining that the trucks are not placed as desired.

The problem of making the coal and service agreeable and attractive to the consumer is rapidly shifting from the shoulders of the selling agent to the shoulders of the colliery manager, the selling agent merely acting as a middle man, with no responsibility save that of selling the coal and making the money collections, while the real ones to carry the burden are the mine officials and the consumers.

It will thus be seen that the modern colliery manager must of necessity mould his ability into the shape of modern demand, because the industry at this time is calling for a more and more technical, scientific, and business-trained man than was even dreamed of a few years ago.

QUESTIONS

1. *What is the difference between the hopper type railroad truck and one of the gondola type?*
2. *Name some of the causes for dirty coal at delivery points that do not originate at the mines.*
3. *What danger is there to breakage of machinery from allowing couplings, pins, etc., to be loaded into the railroad trucks?*
4. *A truck was placed at the mine for loading. This truck had previously carried a load of sand. How would you direct it should be cleaned to obtain the greatest security from dirty coal?*
5. *What system would you employ in the mines to guard against the loading of impurities by loaders?*
6. *Which kind of bottom in the mine allows the coal to be loaded the cleanest—a hard bottom or a soft bottom? Give reasons for your answer.*
7. *In the text what are the three conditions that stand out prominently in the coal business?*
8. *Write a fuller meaning of the three ways the consumer's money can be gotten.*
9. *Who or what are the two vital factors to be taken into consideration in the problem of works management?*
10. *What is meant by "confidence" and "team-work"?*

LESSON VII

GIVING the consumer coal " when he wants it " is one of the ways spoken of in the previous lesson to get the consumer's money.

For instance, if the coal is contracted for delivery on the fifteenth of the month, start it out in time to reach its destination in time, of course not figuring on conditions beyond the mine manager's control. Don't wait till the fifteenth of the month and then start the truck out. When this starting is deferred, many times something has happened and the truck cannot be got out, and trouble and disappointment follow, making it expensive for the consumer, annoying to the shipper, and calling for numerous explanations, which at best are not pleasant.

The consumer has no storage room and must either close his works or buy coal elsewhere at a higher price. He gets this quick emergency supply, unloads it in his bins or bunkers, and your delayed truck arrives. He can't handle it for several days. This incurs demurrage charges, and remember THESE DEMURRAGE CHARGES ARE RIGHTLY CHARGEABLE TO YOU, although the consumer is usually obliged to assume the charges, which decision will bear argument against being right.

If the consumer refuses to accept the truck, all concerned are losers : if he loses confidence in you, YOU LOSE THE CONTRACT, THE COMPANY LOSES THE PROFIT, THE MINERS LOSE THE WORK, and it is indeed very hard to figure just where the loss will stop, as new contracts must be sought, which cost money to procure, or the company makes no profits, and the miners seek work elsewhere leaving you shorthanded.

It will be seen that if this slipshod method of filling regular and profitable contracts in a haphazard way continues, not using judgment as to time the coal will be on the way

under normal conditions, it will not be long before an unrest is started in the workmen's quarters, and they begin to move out, seeking work elsewhere, where work is more regular, and where they can build hopes on remaining as long as they desire.

USING THE EQUIPMENT THE CONSUMER CAN HANDLE. This may not mean much to the colliery manager, but it is a vital requirement with the consumer, especially one with limited unloading space and equipment.

When the demand for coal is great, it is easy to dispose of it, thereby keeping the mine running and the miners contented, but when there is a slump in the coal market, and requirements for supply fall off, then the small consumer's trade is sought after.

The small consumer is not equipped with steam and electric hoists, shovels, and modern appliances, and for this reason the kind of truck best suited to his requirements is specified.

Some of the common troubles that occur between the producer and consumer are as follows :

1. The truck furnished by the Coal Company was too long for consumer's city sidetrack.
2. The truck furnished by the Coal Company was too high to enter coal yard of the consumer.
3. The Coal Company sent the consumer a gondola when a hopper was specified.
4. The Coal Company gave the " small consumer " a large truck upon which he pays demurrage charges, because he only orders a few trucks per year, leaving the impression that his business was not appreciated because it was small.

It is often curiously wondered by the foreman and outside foreman why these requirements are specified, and it has been found very good practice to let the foreman and outside foreman pay a visit to the consumer's plant with a view of seeing :

1. Under what conditions trucks can be placed at the mines which will be best for the consumer's requirements.
2. To see what truck space the consumer has at his plant.
3. To see the equipment the consumer has for unloading, such as trestles, shovels, men, etc., at the place where the coal is expected to be unloaded.

If the outside foreman and the underground manager were sent to the consumer's plant to make this inspection, and afterwards to make a report of their observations to the colliery manager, with a view to recommending "*betterments for the trade,*" they would feel a personal responsibility in seeing that their own recommendations were carried out successfully, which personal interest is not always manifested in the case where a superior officer makes the recommendation, especially if the mine officials know this superior officer is an office man not trained in coal mine work.

This is another way for the colliery manager to show his broad gage calibre in putting team work into practice, right at the source of the problem.

After this visit to the consumer's plants, the foreman can see exactly what the trade expects of the mining officials, and it is not hard to see from a managerial standpoint the vast amount of good this visit will accomplish, as the foreman will explain it to the foremen and under-managers, they in turn to the miners, the outside foreman will explain it to the tipple foreman, the truck cleaners, placers, and loaders, and in fact the explanation will be far reaching. It is needless to enumerate all the good to be accomplished by having the operating officials make these periodical visits, instead of the office force, and the mine officials being thus enlightened first hand as to the requirements of the consumer.

If a complaint is afterwards received, let the man go to see it in whose department the complaint originated. For instance if it was dirt, pig iron, couplings, sand, etc., mixed among the coal, let the cleaner go and see it ; if it was bad, uneven loading of the railroad truck, let the loader foreman go to see it ; if it was late delivery of the coal to the tipple at the mines, let the mine foreman go, or question him why the coal sufficient for this loading was not produced, in good shape and on time.

If it was not the fault of the mines, the colliery manager should take his way bill and show the consumer the date the truck was delivered to the railroad company. All these little things have a tendency to cement together the workmen, employers, and consumers, instead of them acting

like armies battling against each other, with no co-operative plan of attack, consequently no objective in view.

It is customary for the main office to send the sales agent, the manager, or some other high official to investigate these complaints, and make adjustments, but this has not always been the best practice, for when the official comes back and writes a letter to the mine management, explaining the complaint in detail, it is received by the colliery manager and under-manager with more or less indifference, and with their decision that the sales agent is always complaining about something of which he knows nothing.

It can thus be seen that recommendations or censure from higher up officials are not always productive of good, but where the parties interested see with their own eyes, make recommendations with their own letters and supervise the results personally, it is needless to repeat that every effort is going to be made to see that a repetition of the complaint will be avoided, if at all possible to do so.

It has been said this would entail too much expense, but the reverse is true, because the higher up official's time is more valuable than the mine official's, as figured by the day, and he probably has to go further to the consumer's plant, he usually travels more luxuriously, all of which tends to show the error of saying the operating man entails too much expense. If this method of sending the mine official to the seat of trouble is followed, there may be some minor characteristic about the coal which would tell him at once just what section of the mine it came from, making quick action possible in eliminating a chance for future complaint from this source.

If the mine manager or superintendent can arrange to follow this method, he will not only apply the remedy to the seat of the trouble, but will put a new thought into the minds of the under officials, namely : the thought of learning business management, and learning it by actual contact with business problems, which is the very best way to learn it, and when the mine man couples this with the teaching of business management as taught in colleges, he has a valuable asset at his command.

These men by this method or procedure are unconsciously acquiring the principles of management, so that in time they

will be available for more responsible positions, due to th wide knowledge of the requirements of the trade in wh they are employed.

They become expert in scientific management, and th develop analytical minds, which enable them to cope w very knotty management problems.

The old methods of managing a plant so that no one co take your place when you are away has been found to be t expensive, and has been declared obsolete, and shows efficiency in the principles of management and has given w to the more modern method of training officials when you so they can easily step into the more important places responsibility, without being agitated or nervous, and witho causing any alarm or anxiety on part of the directors stockholders of the company.

It can be said here that the successful coal mine manag is the man who has perfected his organization at the mi in such a manner that a under-manager's work can taken up at any place, by the next man in line of promotio continuing this procedure to the bottom of the official st or organization. This successful manager or superintende is always on the alert to find, or round up new material develop into officials, to fill up his official family. He variably finds the young man in his own employ the b material for his purpose, going outside the ranks of his o employees only when he can't find suitable material wit to fill his needs.

The young man growing up in this company's empl is moulded and shaped into the way this company d business, so that when older he will in all probability foll his early training, while the early training of the new m brought in may not fit in with the company's desires and is often dropped from its employ.

QUESTIONS.

1. *What is your idea of training the young man so that he c take a superior position and fill it with credit when cal upon?*

Do you think it good practice to promote workmen to foremen from your present employees, or to hire them from outside sources?

State your idea of some of the points a successful colliery-manager should observe which are often neglected.

Name a few of the things that tend to bring about better relations between producer and consumer.

Do you think it good practice to send under foremen to see consumers when complaints are made?

If so, is there any advantage in having them make written and joint recommendations how best to prevent a recurrence of the same complaint?

Enlarge on the four troubles named in the text that occur between producer and consumer.

Name the items the foreman from the mines should observe in the consumer's plant when being sent there to adjust a complaint.

Why should the small consumer be cared for?

Name some of the troubles and inconveniences experienced by the consumer when his coal does not reach him on time.

LESSON VIII

MINING villages as a rule are not so situated that the social life of the inhabitants can be varied very much ; in fact most villages are of such a size that there is not much chance for class or social distinction. This being true, the whole population seem to almost " live for each other," by this I mean, they are all known to each other, and share in each other's joys and sorrows just as a large family share in the affairs of each member of the family.

Of late years managers of coal mines have realized the necessity for providing some place for community gatherings a place where the workmen and their wives and families can assemble and talk on the current topics. The ladies have their sewing clubs, their literary clubs, reading rooms, etc. ; the men have their smoking rooms, billiard rooms, bowling alleys, etc., and one rarely finds a mining village to-day, that has not its up-to-date moving picture theatre.

These gatherings are generally under the management of the company officials upon whose property the halls are erected, but occasionally, these halls have been allowed to be operated as a sort of a co-operative affair, in which the workmen and their families have considerable power in selecting the management and the class of entertainment that shall be provided therein for its patrons.

In some villages the schedules of attractions are made and advertised, and affairs conducted by the companies, but this has not always borne the best fruit of the enterprise, as it was not a matter of choice with the workmen as to the class of entertainment they desired, but rather a paternal spirit was exercised over the employees by the companies, in a way that it appeared they (the companies) provided the class of entertainment they thought best for their employees to receive.

Instead of this welfare movement being an added attraction, incentive, or inducement toward loyalty and contentment of

the employees, the fundamental principles of the movement are lost sight of, and instead a strict commercial enterprise is established, in which the pound note is the uppermost thought, and if a profit in £ s. d. cannot be shown from the receipts of admissions it is called " an expensive undertaking."

This plan surely is an expensive undertaking, and the method carries with it the idea that the company has added another venue through which it can travel in order to be able to acquire another part of the workmen's wages, which is always so distasteful to conservative and steady, responsible employees.

This surely is bad practice, as compared with the practice of turning the community centre over to a board of managers, which is composed of workmen and officials, they in turn passing judgment on the kind and character of the entertainments that shall be allowed, and also forming plans so that the association shall be self-sustaining, without being a burden on any one, thereby acknowledging the fact that the workmen are in a measure capable of self-government.

The paternalistic attitude so often spoken of in other terms, and practiced by men delegated by the works management, goes hand in hand with the " strong arm methods " so far as the average mine worker is concerned. It is distasteful, obnoxious, and resented just on " general principles " every time it is observed, but sometimes a cunning manager " puts it over " on the employees, boasts about it, and in a short time it reacts and manifests itself in every dealing thereafter which the management has with the acting workmen, and as a boomerang, it returns and rests at the place where it originated.

It is true the company is at great expense to erect these halls or community centres, some of which are magnificent in their appointments, but by a careful analysis of conditions, it can readily be seen these privileges are not a substitute for wages, neither can they be shown to be a method where all workmen share alike in their appointments, this latter feature being a cause for complaint, and a remedy has not yet appeared.

These so-called welfare movements as a rule are well meant at the beginning. The operator desirous of doing something for his employees inaugurates a plan calling for a series of enjoyments of varied character, which movement is very

commendatory on his part, but due to the press of other matters he relinquishes *personal* interest in it, and directs the works management to continue the movement. At this stage, many works managements have discovered that there is here a place where a profit can be made, and thereafter the commendable spirit of the operator is buried without honours, and the movement is looked upon with contempt by the workmen whom the benefactor sought to benefit and for whose entertainment and convenience he expended his money with this objective in view, which was lost in the interpretations of his desire by the works management.

Much good has been accomplished in mining villages by the manager looking ahead for chances to show a personal interest in the workmen's affairs. For instance, in the summer time when the weather is desirable, picnics, outings, dances, etc., can be arranged, and especially when orders are plentiful and workmen are scarce can the results of this be seen. This personal interest should not take on a paternalistic attitude, but should make it possible for the workmen and their families to take advantage of it, if they so desired.

If nothing is provided at the mines, the workmen with their wives and families make ready for a visit to other places, where there are some special features going on, or perhaps make the holidays a chance to visit their relatives. Next morning the manager finds these men have not returned to work. They wanted to stay longer, as they don't get away very often ; or there were bad or faulty train connections. They may also have been a little indiscreet. The upshot of the whole thing is, the output suffers the day before the holiday, and also several days after the holiday, due to employees absenting themselves from work. This could have been almost entirely avoided, if the management had provided some sort of substitute for this departure from home for entertainment.

The community nurse, among other duties, supervises the recreational activities of the female population, and although she has not yet acquired the bold title of " Engineer of Female Recreational Activities," she certainly has been found to be a valuable adjunct to the superintendent's organization. It has been well said that a man well satisfied in his home life makes the best workman, for when a workman is troubled with home affairs, he cannot give his best service to his em-

ployer, and oftentimes in the presence of danger he does not take sufficient safety measures to insure himself from injury.

The male person who has been secured or appointed to look after the social activities, the recreational activities, or the amusement activities among the male population has not been satisfied with the common term or title of " Leader of Activities " or " Overseer of Sports," but has self-styled himself with such bold titles as " WELFARE ENGINEER," " ENGINEER OF INDUSTRIAL RELATIONS," " SPECIALIST IN WELFARE ENGINEERING," " EXPERT IN MINING INDUSTRIAL RELATIONS." These titles, added to numerous others, convey to the coal miner the fact that their leader in sports desires them to bear in mind the fact that he is not by any means an ordinary man at sports, but a scientific, college-bred analyst, and has been secured to direct this work, or has been appointed to oversee it, at a high salary which puts him in a class by himself.

These titles are very appropriate and rightfully belong to the man who has spent years of study of human relationship along engineering lines, one who can and has planned big things which other men can work out successfully under his engineering advice, but these titles are entirely out of place on the football field, in the moving picture hall or on the race track.

It can readily be deduced from the foregoing that part of the " leader's " prestige to be " one of the boys " is lost in his bold desire to be " above one of the boys," and it is through this very desire that many recreational men do not make good in many cases when in charge of welfare and recreational activities around coal mining communities. It is therefore imperative that the manager choose a man for this post who at least has given some thought to the foregoing, if he wishes to get the best results from all angles.

QUESTIONS

1. *What do you think some of the appropriate titles for a male recreational director should be?*
2. *Do you think a nurse should be employed at a mining village to look after the health, social and recreational activities of the female population?*

3. *Do you think that recreational halls or community buildings should be free to employees and their families, or that a charge should be made for admission to entertainments? Give brief reasons for your answer.*
4. *State some of the advantages to be gained by the workmen having some responsibility in the management of these centres.*
5. *What is meant by "paternalistic attitude," "strong arm methods"?*
6. *State your ideas why bold, large titles should not be employed to designate the leader of sports.*
7. *Show by example why it pays for the works management to provide amusements in the home town on holidays.*
8. *Do you think the leader of sports should have any other duties about the mines?*
9. *Can any loss of output from the mines occur by reason of having moving pictures during work hours?*
10. *Out of respect for gatherings that were only periodical, would you, or would you not, close the pool room, the moving picture hall, the bowling alleys, etc., during the period of time the special meeting or gathering was going on?*

LESSON IX

In all industrial establishments and businesses a certain prearranged and predetermined sum of money from the earnings is set aside for various reasons, and even to offset various complications that might be expected to arise. These set-offs, or whatever name the accountant uses, are simply a safeguard, in times of peace and plenty against the ravages of hard times when no money, or at least very little, can be made.

In figuring the total cost of the mine product, and this must be done accurately, before any figures are arrived at in connection with the selling costs, some of the set-offs are for depletion, depreciation, repairs, improvements, insurance on property, etc., and while all this was going on and the costs of these items was ascertained by skilled auditors or actuaries, the entire amount was charged to the cost of mining coal, and of necessity was charged to the selling price, in order that the margin of profit desired would not be attacked.

The mine worker, who is certainly an asset to the coal companies, was not protected, that is, if an accident happened whereby 20, 30, or 35 per cent. of the employees were incapacitated from further service temporarily, no insurance was placed to offset this cause. In addition to this, the company was compelled, from humane reasons, to see that these employees were supplied with nourishment and medical aid until they were again self-supporting, bearing the expense from their profits, and oft-times these profits were greatly depleted by such occurrences.

It would seem, then, that all modern mine managements realize the necessity for that branch of service given by insurance companies, and by some states known as compensation insurance, and such service and protection is rightfully due the mine workers, and the cost legitimately borne by the consumers, the same as all other legitimate charges are borne by the public.

It would seem folly to expect a merchant, whether he be a

grain merchant, lumber merchant, or coal merchant, making a stipulated margin of profit, to continue to sell at the same figures, after rents advance, transportation rates advance insurance rates on buildings and business advance. In this case no objections are made to increases to the public, just so long as these increases are kept within reasonable limits and only a fair and just profit accrues thereby. This being the case, then, why should not coal miners be protected by compensation insurance of some sort, and the cost be borne by the industry?

The public must have coal, and of course the coal miners must dig it. The insurance companies, life, accident, compensation or whatsoever kind of insurance their charters allow them to carry on, in their wisdom after years of research and actuarial efforts, have decided that coal mining is a "hazardous occupation" and proceed rightfully to collect an extra premium for their services, above that charged by themselves against insurance service for occupations classed "non-hazardous," and for which the coal mining industry either pays, or has another alternative, which is work uninsured. If such conditions really exist, and they surely do, cannot the question be asked in all sincerity and fairness, "If insurance companies rightfully ask an increased premium on hazardous occupations, and do it legally, why cannot the coal industry ask increased selling prices on coal to furnish the cost of the insurance to mining employees?" The insurance companies collect from the consumer, that is they collect from the persons using their service or products; then what difference is there between that system and the system of the public using the service of the coal miners or the products of their labour? To me they both look almost alike, with possibly the best reason for argument being given by the coal industry.

It is true that possibly the majority of large operators of coal mines are now taking advantage of the movement of insuring their employees against serious and non-serious accidents; but the problem for colliery managers to solve seems to be, Who shall pay the premium—the workers, the companies, or the public?

This is surely a commendable problem to work upon, and one in which a colliery manager can find lots of food for thought. While it is practically new in the United States,

I am told it has been in effect in forty or more foreign countries, which include practically every coal mining country in Europe. In Great Britain this point is governed by the " Compensation Act " of their Coal Mines Regulation Act. America was just a little bit behind in getting a good start, but since starting, she has made her efforts snappy and to the point, has made wonderful progress, so that it no longer becomes the painful duty of the manager or co-worker to be compelled to leave his work and testify in court as to just how the accident happened and who in his judgment was to blame. No matter how the accident happened, right or wrong, whether it was shown to be the result of contributory negligence or not, there were always reasons for doubt as to the legal interpretation and ultimate decision, and these reflected their influence upon the families of the injured person. The plan of compensation seeks to remove this.

Suing for damages, for the loss of a limb, for loss of earnings by employees, never helped to bring about industrial peace and harmony. It widened the already wide gap between capital and labour and furnished ammunition for the village orator in hurling his inflammatory remarks against the companies in whose employ the injured person was at the time of the accident. It also gives the village orator a chance to show the workmen (in a biased way) what sort of settlement they might expect unless they do something immediately to remedy matters.

Compensation insurance in some form or other must come. Its delay is expensive to all. Colliery managers especially should be urged to employ its service. Its service is practical, humane and deserving.

If the burden of the premiums should fall upon the mine management or operators, it becomes a matter of personal concern, and the companies, through their managers, will be more severe and critical in their examinations of working places and working equipment, with the idea in view, that to lessen the number of accidents lessens the size of the premium costs, and therefore lessens the ultimate cost of production per ton of coal mined. In addition this lessens the ammunition for enemies of the industry to fight with, and tends to create more industrial peace, more harmony, and a steadier class of workmen, because it removes that fear from

the thinking workman that he will eventually become an object of charity if he is injured.

I have heard it said that this is not a matter of choice with the colliery manager or mine management, but just a decision of the " main office " and about which the manager is never consulted. This is the wrong idea, for it surely does apply against the total cost of coal, or at least from the total profits earned by the company during the year, and therefore must, in a measure, reflect upon the ability of the works management to produce output at a certain figure ; therefore the movement of providing or not providing compensation insurance, and the theory that it does not come within the province of the powers of the mine management or colliery manager, must not be underestimated.

It is true, however, that the same duties are not performed by all mine managements alike. For instance, a large corporation has its inspectors, its actuaries, its claim agents, its legal department, and many other departments, whose duties and functions co-ordinate, making a strong force to conduct these large businesses, and these take upon themselves several of the duties that are required of a manager in companies not so large ; therefore it is to the latter type of manager that the theory, practice and results of compensation insurance necessarily presents itself most forcibly, as in the absence of the different corps of specialists he, the manager, is looked upon to be a guiding light for the business perpetuity of his company, or the company he represents.

It should further interest him as to the just and equitable charge made upon small companies, as against large operations. He should at least know the relative differences necessary to give this protection or insurance to different sized plants. It was found out that during the war with Germany, American mines classed as farmer mines, country banks, peddling mines, wagon mines, etc., meaning those mines which were not situated upon a railroad site, and which only supplied local trade during the winter months, produced approximately fifty million tons of coal, requiring approximately 30,000 men to mine, and if these men were classed as soldiers at home, and gave service at mining coal, why should they not be given compensation insurance for injuries, the same as soldiers at home and abroad are given pensions for injuries received in

service? They are both soldiers and seek to bring about the same results, but one is an industrial soldier, while the other is a military soldier.

It is this class of workmen in particular that are to be considered. They work for individuals, small unorganized companies or associations who either are not versed in industrial relations affairs, unable to be collected from, or who are so busy wrapped up in their desire to make money that they lose sight of the rights of the workmen they employ.

If this class of employers, of which there are a very large number, are irresponsible financially, it can be deduced that injured workmen from these companies become public charges, and must be taken care of by the public. It would seem that the ultimate cost of compensation insurance, which would in a measure protect every worker in the industry, will eventually be borne by the states in which the mining of coal is conducted or carried on, and such costs supported by special taxation against the selling price of coal. In other words, the public will be required to bear the burden, which seems justifiable in view of the facts as here presented.

The coming mine manager will of necessity be a business man, a man capable of analyzing complex situations, and in addition must be a man of mining knowledge and capable of surrounding himself with the very best advisers available, in order that he may bring about permanent success. The question of workmen's compensation is one of the questions that he will often have to wrestle with.

QUESTIONS

1. *How do some companies protect themselves against complications caused by explosions, catastrophies or fires?*
2. *What do you understand by "depletion" and "depreciation"?*
3. *Give reasons why workmen should be protected by compensation insurance.*
4. *In your opinion who should pay the premium, the state, the company, or the workman?*
5. *Why should colliery managers know anything about compensation insurance?*

6. *What makes coal mining a hazardous employment?*
7. *What are some of the bad features that are removed by companies taking advantage of the compensation insurance service?*
8. *Describe some of the ways known to you as to how the premiums on this class of insurance are collected.*
9. *State the reason why a knowledge of compensation insurance workings is not so necessary to colliery managers in charge of large operations.*
10. *State your opinion as to whether state compensation insurance should be available to all persons desiring to take advantage of it, or only to firms and corporations employing a specified number of men.*

LESSON X

THE educational facilities afforded mine workers in and around mining camps and communities are not all they should be, and in many cases not all they could be with little effort. This condition of affairs comes about because of the cosmopolitan group of workmen found in these communities, and on account of these places being in a measure isolated they necessarily, due to lack of accommodations, require the services of unmarried workmen.

After a period of time elapses, the houses, shops, churches, halls, schools, etc., are built, this adding to the environment of the plant, other workmen, married and with families, are more or less attracted to the place, but in due course of time the church and school requirements outgrow the facilities for carrying on this important work, and the result is that many workmen with a keen eye to the education of the children are attracted to other plants where these facilities are held out to them.

It would therefore seem that the mine management or the colliery manager should not let this important problem slip by unnoticed or uncared for, for as sure as he would like to establish his permanency at the plant, just so sure will his requirements need the services of educated men and women, and because of the selfishness, perhaps, within himself, for his own family's culture and refinement, he must needs have the community around him at least the equal intellectually of his own family. So after all, the spirit of education for employees is well founded, far reaching in its effects, and an effort well worthy of commendation.

It has been said that the colliery manager's duties are not that of a teacher of the rudiments of education, but rather that the sole duties are namely: making a profit on the investment, and doing this with as little friction as possible.

The educational scheme can be carried on with many ramifications in mining communities, and its results cannot help but

manifest themselves. It is a radical departure from modern mine management ethics, but lectures given at opportune times about costs, especially how they are made up, what the companies expect from their managers, could be spoken of in a meeting of a mining students' school.

The items that go into the budget of expense, the taxes, the insurance, the charitable gifts, the desires of the stockholders, the efforts the companies expect of their managers to bring about this end, any and all of these subjects could be made understandable to the thinking part of employees, and with much profit to the companies.

The subject of reading from charts or blueprints and mine plans could be brought into play advantageously. For instance, suppose the motorman be given an idea to chart his output daily by using a " curve " or a line instead of figures. Let him get the loader to make a line continuously for a month showing his output, being sure to use a line instead of figures ; let the pumper make a line of his time spent or required at each pump, using of course a predetermined average of time previously spent. By this, if it is done correctly, he will be able to tell just whether the motorman is maintaining his usual output, or getting smaller, whether or not the coal loader is getting out as much product as will make him the same wages, whether or not the one pump is requiring more time this month than last month.

Have the students bring these charts to the classes for discussion and examination by the colliery manager, and it won't be long before the men will develop an interest in enlarging their scope of educational acquirements.

It is needless to say that when working men have something educational demonstrated to them as profitable to themselves, that some little of their spare time will be spent solving the problems of the new thought they have taken on.

It is the mine management's " *duty* " not a " privilege " or a motive more " desirable," but a " duty " which he owes to his company, the public, and to himself, to furnish some " food " for these new thoughts. If he doesn't, someone else will, and the line of education not in keeping with the aims of the company will be developed, and the mine management, due to his indifference or lack of interest, will say, ' After what I have done for these men, look at the results,"

when the true statement should have been, " After what I have not done, I see the results," but it is too late, and of course the company pays the bill.

Education does pay large dividends, but it must be THE RIGHT KIND. Dividends will not come from idleness, it only comes from judiciously sown efforts. Money will pay dividends if placed in a bank, but will rot if left in an old shoe long enough.

The mine management should see that the right kind of education is available for the workmen to take advantage of, must make it interesting for them to absorb, put a little personality into the movement, and this personality coupled with some visible encouragement will work wonders in creating a feeling for good, all through the plant, the homes of the workmen, and the public in general.

It has been proven time and time again that education is the social and financial barometer in business. I venture to say that nearly all the social unrest, the labour unrest, and the necessity for harmony and peace in mining villages is the absence or lack of education, and I earnestly look forward to the time, in the not distant future, when the colliery manager, under-manager, fireman, and under-fireman, will be required to give part of his time to the spreading of education along his special line to the workmen under him.

By this education is not meant arithmetic, algebra, grammar, etc., but a detailed description of the best methods to do a piece of work, the materials required to do it with, the reason some materials are successful and others unsuccessful in performing the work, etc. A man who is unable to be a leader or an instructor has no right to occupy a place as a foreman, and sooner or later companies will see that this is requisite in the man they employ. They will then make it imperative that foremen, of whatsoever kind, have these special educational requirements, in addition to their technical skill in coal mining, so that they may graphically present to the mines management the coming duties that change of time and progress are thrusting upon them.

It is also argued that education is a liability at a mining plant, instead of an asset ; that is, it has been attempted to show that to educate the mine workmen is a stepping-stone to developing their greater abilities, consequently they are

educated away from the mining centres, instead of being educated to perform their mining duties in a more efficient and workmanlike manner, with more satisfaction to the management, and with more safety precautions for themselves and for their fellow workmen. It has also been said by a few that so soon as a campaign of education is manifesting itself visibly upon the capabilities of the workmen, some other companies get these men by offering special inducements for their services. To this it can be said, If you can see the special and advanced ability, deserving advanced recognition, you could retain this employee, by using the same analytical ability of results that your competitor is using.

There is no logical reason why these recently enlightened types of workmen should drift away from you for positions of equal advantage for them, but it must not be lost sight of, that if the workman has equal abilities with the mines management, competitive measures for authority could be set up, and rightly too, because all business without new ideas, new blood infused in the make-up of its management would soon collapse, and its perpetuity cease.

Taking a broad gage view of this problem, the mine superintendent or mine manager has all to gain and nothing to lose by its adopition, and last but not least, the workmen are entitled to it, both for themselves and their families.

In the United States of America the Federal Government at Washington, D.C., through both the Federal Board for Vocational Education and the Board of Education, Department of the Interior, see the coming necessity for this education, and are working without a let-up to get this campaign under way, in the least possible time, but need the co-operation of the mine residents before effectual and efficient results can be obtained.

All colliery managers and other educators, interested workmen, and the general public interested in this movement, and who want special or further particulars of the workings of these educational institutions should write Federal Board for Vocational Education, Washington, D.C., or to the Bureau of Education, Department of the Interior, School Administration, Washington, D.C., the former department having for its purpose the advancement of education among workmen, conducted in part-time schools and along lines of their daily

employment; the latter department extending its functions along lines of establishing and giving the proper kinds of education best suited to the communities' individual needs. These two agencies have plans well worked out, and the co-operation of mine managements with these agencies will be found profitable and interesting, and educational alike to the management and the workers.

Companies and communities can avail themselves of these privileges by letting their wants be known through the proper channels, but to date only a comparatively few have taken advantage of the benefits of these agencies. However, several states and institutions have taken advantage of them, most notable among them being the West Virginia University, Morgantown, West Virginia, which is the state institution of learning, supported by taxes and state appropriations.

This institution has built a course of mining instruction suitable for men at the mines, and has been sending men from the university yearly for the past eight years, to mining communities, where schools were established in the evenings right on the mine property, making it possible for the workmen to receive instruction from well-informed teachers, without losing time from their work, or leaving home.

This makes it practically inexpensive for the workmen, makes them better equipped for their work, for society, and with the least inconvenience possible to themselves, as it practically brings the university to the mines instead of requiring the miners to go to the university.

The success of this undertaking reflects great credit upon the state of West Virginia. It has made a phenomenal success of the movement, which perhaps is shown best by the numerous requests for their methods and lists of studies from almost every state in the Union. It was from this institution that the Federal Board for Vocational Education, Washington, D.C., selected its man in the person of Professor A. C. Callen to make a survey of the different mining districts in the United States, to ascertain what plan of study course should be mapped out that would be suitable for gold, silver, copper, zinc, as well as coal mine workers.

The success with which Professor Callen had directed the work in his position as Head of the Mining Department of West Virginia University, coupled with his practical work at

mines, as a constructing engineer erecting mine buildings, and as a teacher of these subjects, made him an ideal man for this important piece of government work.

Other states are now doing the work, but their success has not yet reached the stage of satisfaction due to the short period of time the work has been going on.

Working along these lines somewhat is the Co-operative Department of Mining Engineering, in the Carnegie Institute of Technology, Pittsburgh, Pennsylvania. They have diverged somewhat from the traditional course of training students for positions at mines, and took into consideration what the mining industry demanded at this time. The scheme was only started in 1919; therefore very little can be said about it, except that it seems to meet the needs of the coal mine operators owning and operating mines in the Pittsburgh district, which is taken as indicative of the requirements of the majority of coal mine operators in the country.

In discussing the kind of mining education suggested for the needs of men without any academic education, or at least with a limited amount, no suggestion is passed without severe criticism. Mine managers do not all see results from the same angle; but regardless of these criticisms, whether for or against, they show one thing forcibly, that is interest, but whether this interest is constructive or destructive depends upon the amount of interest displayed by the men taking part in the discussion, but the concertive and collective action vigorously employed by the champions of education assure in a measure its advantages and hopes for permanency.

Taking a résumé of the details as here presented, it can be plainly seen that it is advantageous to mine managers to interest themselves in the education of their employees, thereby conferring a help upon the workmen. By so doing they are helping themselves, which seems to be, nearly, the first law of nature.

QUESTIONS

1. *Is education an asset or a liability?*
2. *Which would you prefer for workmen, the educated or uneducated man?*
3. *State your opinion in regard to whether or not a mine manager should interest himself in the education of his employees.*

4. *Where can financial and educational assistance be obtained? Write a letter purporting to be your plea showing why your employees are entitled to governmental aid.*
5. *Do you think a made-to-order schedule of studies for all communities in the country the best plan, or would you advise a separate course for each community, bearing upon the specific needs of that community?*
6. *In selecting your teacher for these mining schools or vocational schools what would guide you in making your selection?*
7. *State some of the advantages as you see them of the results of education among workmen.*
8. *State some of the criticisms most likely to occur in launching an educational campaign at mines?*
9. *What defence would you offer to each?*
10. *Should the government finance these movements, or should the employees finance themselves, or should the companies finance them in their respective villages, or would a financing from all parties bring the best results?*

LESSON XI

Soon after the mining of coal commenced and up to the present day there have grown differences of opinion as to the just and equitable settlement of pay, conditions of employment, and amount of work turned out by the worker, and whether or not the employer was satisfied with results ; therefore the problem of adjusting labour controversies requires as a basic foundation a thorough dual knowledge of both sides of the equation, which should be thoroughly understood by the mine management before any adjustments are attempted.

In the production of products in every line of business we are governed by the law of supply and demand. In the manufacture of the product, or in its production, whether or not it requires manufacture to make it useful, we get two vital factors—the worker or employee, and the manufacturer or employer—each having their own opinions and ideas of a just and proper solving of the particular problem at issue, and these opinions are at a wide variance from each other, requiring cautious movements from both sides in order to avoid a rupture.

Labour controversies are not the problems of one set of workmen, one political faction, or of one country, but are always found to exist in all industries, and in every country on the face of the earth. It is perfectly true that these controversies over labour do not always point to the monetary consideration alone, but they very often take on the disputes and differences that are vital to the industries, the public, the employer and employee, and the outcome of these controversies is felt generally, and is not confined locally, nor to the employees and employer where the disputes originate, but show themselves in nearly all branches of industry in some form or other.

With the cosmopolitan workmen found in coal mines, men from all quarters of the globe, men of traits and characters good, bad, and indifferent, coupled with the delicate, intricate, and expensive machinery required to mine and produce the

coal at great depths from the earth, the making of adjustments is a very complex problem, especially through abnormal times of great prosperity and panics.

The profits from investments, the wages received by the workmen, the length of the working day, the housing and sociological conditions of the workmen, are the prominent factors in making labour controversies, which necessarily call for adjustment later on. These are the problems, mine managers are learning, that require very careful thought and study.

When these factors divorce themselves from each other, either by accident or design, a dispute is born, which on many occasions terminates in a strike, lock-out, walk-out, or whatever name it is known by, this movement being simply a cessation of work by the fancied aggrieved party, and its results are forced upon all parties.

This cessation of work is usually followed by many inconveniences to employees, employers, and the general public, and results in financial loss to employers, employees, and the general public. If the cessation is prolonged, it usually develops dissatisfaction, discontent, and ill-will between the interested parties, and often becomes a question of physical and financial stamina, rather than a problem of human relationship between employed and employee. Here is shown the managerial ability of the mine manager, as to whether or not his choice of a welfare man, or industrial relations man, measured up to the task in hand, in finding or working out a satisfactory solution to the problem.

It would seem that the cessation of work could be avoided or at least checked in its progress if the management would be on the alert and watch for symptoms, if the management would anticipate these growths of labour unrest, so that a remedy could be applied when the symptoms first made their appearance, not waiting until the trouble came to a head, in which case it would need treatment from many sides and the correct solution viewed from many angles as to its effectiveness would require several men to apply a suitable remedy.

In the adjustment of this controversy there are many factors to be taken into consideration if a thorough knowledge of the controversy and its adjustment is desired. Principally among them are :

From the workman's standpoint :

1. Will I win?
2. Have I got what I asked for?
3. Will it prevent me from asking for further concessions or adjustments if conditions warrant it?
4. Is the settlement giving me a square deal?

From the employers' standpoint:

1. Will my profits or returns be as large as before?
2. Is the adjustment flexible enough to allow me a revision if necessary?
3. Will it require a larger working capital?
4. Can I depend on the workmen's loyalty as I did before the new adjustment rate went into effect?

Each interested party is desirous that the progress of the work shall not be interfered with, that his individual rights shall not be abrogated, that there shall be no abscission in returns either financial or otherwise, but the paramount question in the matters at issue is the base on which this desire to be fair and square is built and adhered to by either party.

In the adjustment of these controversies the aggrieved parties are too prone to demand that adjustments be made on their particular conception of fairness. They give no study, forethought or foresight, as to the rights and privileges of the other party. This, in turn, erects a barrier against the speedy and amicable adjustment of the questions at issue, and the extent to which the results are liable to affect the other party. The main cause actuating him to form his desire for a plan of fairness as he alone sees it comes from a lack of knowledge of both sides of the controversy so that it can be readily deduced that the modern management must of necessity know considerable of labour problems and their adjustment.

This condition of affairs is in a measure responsible for the formulation of labour unions, and employers' associations, all of which have for their ideas a closer relationship, collective bargaining, and a conservation of returns both from a financial and sociological standpoint, which affects the status of either party.

Even with these organizations perfect harmony has not been brought about in all cases, as is evident from the social and labour unrest of most countries during the past few years.

This surely should be a lesson showing that the present-day coal mining industry requires men for managerial positions who have given close thought and study to industrial affairs, especially as they directly affect coal mines.

QUESTIONS

1. *Write a brief outline of the differences of opinion that first cause labour controversies.*
2. *Would a man with one-sided knowledge make a good adjuster of labour controversies? State fully.*
3. *What two principal factors enter into the manufacture or production of coal?*
4. *In the matter of labour controversies who are the parties affected? Are the public interested in any way?*
5. *What is meant in the text where it reads "making adjustments now is very complex"?*
6. *What generally causes a dispute which terminates in a strike, lock-out, etc.?*
7. *In making an adjustment in case of a labour dispute, what are the factors taken into consideration,*
   - *a. From the workmen's standpoint?*
   - *b. From the employer's standpoint?*
8. *What is generally the base upon which the desire to be square and fair is built?*
9. *In making adjustments why should the rights of the other parties be given consideration?*
10. *What is meant by*
    - *a. A labour union?*
    - *b. An employers' association?*
    - *c. Collective bargaining?*
    - *d. Labour unrest?*
    - *e. Physical and financial stamina?*

LESSON XII

BEFORE the advent of the labour organizations, if a workman or a clique of workmen became dissatisfied with the terms of their employment, or the employer became dissatisfied with the workmen, a change to suit either party was made without ceremony.

If the workman felt aggrieved, he ceased to work and left his job vacant, the employer filling the vacancy the best way he could. If the employer became aggrieved he dismissed the workman, and filled the vacancy with the very best man available, this condition going on and on, with no consideration or forethought given to the far-reaching effects on the general public.

In order to combat these evil and growing tendencies, which were unapproved by the leaders of both workers and employers, combinations were formed by workmen and employers, and their necessity is seen every day. These combinations aim to be fair and to settle without delay all disputes as soon as possible after they originate. This brings about a lasting peace between employee and employed, which ultimately reflects its beneficial effect on the public as well as the directly interested parties, and, meeting with public approval, seems to be a step in the right direction.

Where the questions at issue are vital, where a satisfactory agreement cannot be worked out by the affected parties themselves, and where a cessation of work is injurious, a third party is called upon to exercise his good offices in helping and assisting to formulate plans fair to both parties.

Many times these third parties are disinterested and unbiased in their opinions and conceptions of the grievance, and base their decisions on the evidence given by both the aggrieved parties. This method of adjusting labour controversies is known as the arbitration method, each side of the question choosing another party jointly; that is, the employer chooses

a representative, the employee chooses a representative, and these two chosen representatives jointly choose a third representative.

Before hearing evidence on either side the grieved parties pledge themselves to abide by the decision of the arbitration board, whose decisions are final, in so far as the adjustments of the questions at issue are concerned, and it follows that neither party has the right of appeal. This in reality is a plain forced settlement of labour controversies, and has not worked out satisfactorily to the contending parties.

Very often controversies are begun by a misunderstanding of the terms and conditions with which and under which both parties are operating. This is easily and speedily adjusted, by placing a very plain and unmistakeable construction on the meaning of the agreement governing the work in hand.

In any and all cases where employer and employee have controversies, great care should be taken by both parties to make the adjustment methods so that they may form a basis for future decisions of like nature ; and great pains and care should be taken to avoid having any destructive phrases written into the agreement by either party.

The mine management should be very keen in analyzing these agreements, studying each detail separately, because if care is not exercised in this matter and a dispute is born of the interpretation of a destructive phrase that had been allowed to enter the agreement, it becomes known to the workmen, who will afterwards have a mistrust for agreements generally and make themselves hard to govern.

It is needless to say that where these destructive methods have been employed, the clean, conservative, and ambitious workmen leave the plant where they have been treated unfairly, or have been deceived by the employer, leaving in the hands of the employer, the shiftless, unsatisfied, inefficient and undesirable workmen to whom he must look for his products and profits henceforth. This then, is very poor management. It shows that deceptive methods of whatsoever kind used to bring about results in adjusting labour controversies are short lived, and usually act as a boomerang on the parties employing them. They should therefore not be countenanced by either party to this agreement.

Where combinations exist, either of workmen or employers,

the " fair and square " desires of either party should be uppermost in mind. It is very destructive to make excessive demands, especially at times when the lives of the industries are critical or hanging in the balance. Public sentiment is opposed to it. Industries should be fostered and allowed to grow, and if they can stand the storms of competition, and are assisted until they become a healthy size and able to care for themselves among other industries, the chances are that by efficient management they will prosper.

They must stand severe storms of competition to which new industries are subjected, and if this is done, satisfactory solutions of labour controversies will be brought about in due time and with the minimum trouble to all.

If a question of loyalty is introduced and this question relates to employer and employee alike, and this loyalty is made and shown as genuine, so that no mistrust or antagonism between either party exists, many of the labour problems would be avoided, thereby eliminating the necessity for adjustment.

From the foregoing will be seen the necessity on the part of the works management to sow the propaganda seed of loyalty and co-operation among its employees, and the energy and money so employed will be well spent.

QUESTIONS

1. *Why should new coal companies be encouraged in a neighbourhood ?*
2. *Do you approve of making excessive demands with a veiw of " giving in " a little if necessary ?*
3. *What are some of the reasons during a labour controversy that some of the best miners leave the plant ?*
4. *Is it profitable to the operator when some of the best men leave ? State fully.*
5. *What is meant by making the adjustment methods constructive ?*
6. *What is meant by an arbitration board ?*
7. *Is the arbitration method always satisfactory ? State fully.*
8. *How are misunderstandings avoided in making agreements ?*

9. *Before labour organizations were formulated what was the general method of procedure where the employer was not satisfied with the workman, or where the workman was not satisfied with his working conditions?*
10. *Is it best for the mine management to settle labour controversies at the mines, or allow them to go to headquarters of coal companies or labour organizations?*

LESSON XIII

WHERE a cessation of work has appeared, regardless of how it was started, something is left in a weakened condition; usually all parties concerned suffer, and many of the workmen who by the hand of adversity are in a very poor condition physically to withstand a struggle, succumb to the terrible influences created thereby and become burdens upon society. This is strong evidence of the necessity for employing officers both for miners' unions and operators' associations, who by their former contact with the questions at issue have shown and proven themselves to be men of integrity, ability, and good judgment, men who can realize that their responsibility increases with their power, and who in making decisions consider the general public as well as the workmen and employers.

They should be men who can analyze situations clearly, men whose analytical minds are capable of dissecting, after discovery, every phase of the controversy from employer and employees' standpoint alike, so that when they go into conference to adjust matters, they go as gentlemen in every sense of the word, men whose word is as good as their bond, men in whom the workmen and employers repose the utmost confidence.

It this is done there will not be any doubt as to the outcome of the conference with reference to a resumption of business on a more solid and lasting foundation, and many of the labour controversies that arise in coal mining communities will be eliminated.

This is a period of co-operation. A larger co-operation has never been known or imagined than the co-operation of the staggering numbers of people represented by the allied armies in the late war with Germany. They co-operated in such a way as to move as a unit—of one accord—and with one object in view—the winning of the war, and this was accomplished in far less time than was anticipated, after America's entrance.

This object could never have been attained if there was not co-operation all along the line. This proves conclusively that co-operation is necessary to satisfaction. Workmen want pay for their services, manufacturers want workmen to produce coal or whatsoever products they produce, thereby making it possible for them to receive dividends. Each must co-operate with the other. Neither party can accomplish much singly. The sooner employers and employees see and put into effect the spirit of co-operation in their everyday tasks, the sooner will labour controversies take a tumble in numbers and magnitude, and the sooner we will enjoy a pleasing and lasting condition in the ranks of labour. This is another problem for the works management to battle with and solve.

Considerable of the dissatisfaction appearing is the result of the lack of education and proper environment of the worker, and sometimes of the employer. If the mine workers were educated to a point where they were able to solve the present-day social and economic problems for themselves, they would become better workmen, be better satisfied, and make far better citizens of the country in which they live. This is another problem of education for the management to solve.

This education can be brought about by the management of the mines encouraging the miners to study the different phases of mining that enter into their everyday work. The study of human nature as shown in the individuals connected with the mining of coal should be encouraged. In short, if the management is successful in getting the workmen to study the theory and practice of the vocations in which the different mine workers are employed, coupled with a knowledge of related machematics, it will make workmen more efficient, make mine owners more proud of their workmen, and make workmen and employers loathe the appearance of a slacker in education and a walking delegate alike.

The mine management should remember that in many instances the workmen have been compelled to leave school at an early age, in fact long before they have even received the rudiments of a practical education. In after years these persons become restless, and give too much thought to the hearsay and loud talk of some of the more radical workmen. This is due to their inability to read the current newspapers,

which would employ part of their time, inform them first hand of the current news and happenings of the day.

In many cases at present there is a growing tendency by the ambitious few to become educated, with the hope that in the future they may become leaders of their professions. To these students of home courses of study, or study by correspondence, great encouragement should be given, for much benefit can be obtained by the developed and trained minds of the workmen, which will afterwards revert to the advantage of employer and employee alike.

There is certainly no doubt about this, and the sooner the works management realizes it, the better off they will be. It is rapidly being recognized by the wide-awake employer, and to-day we find the coal companies building, financing, and equipping schools and laboratories and institutions of learning with a view of making their workmen more efficient.

Mine managers should give more attention to the distribution of mining literature among the workmen. The United States Bureau of Mines publish bulletins at intervals on the different phases of coal mining that can be had for the asking. The Federal Board for Vocational Education at Washington, D.C., have published a number of elementary texts on mining matters, such as Mine Gases, Coal Mine Timbering, Mine Safety Lamps, Mine Ventilation, all of which are helpful to the student, and by studying their pages better workmen are made.

The Bureau of Education at Washington, D.C., are wide awake to the necessity for better education in coal mining communities and will co-operate along this line for the mere asking.

QUESTIONS

1. *Where would you advise your employees to get the best literature possible for a small cost to enable them to study mining?*
2. *Why should mine managements give encouragement to home study or correspondence study among their employees?*
3. *In what way do companies benefit from having their employees educated?*
4. *What has been the reason for lack of education among mine employees?*
5. *Do you believe in co-operation to attain results? Cite one example where co-operation played a very important part.*

6. *What is meant by the present-day social and economic problems?*
7. *Why should officers from labour unions and employers' associations be educated men?*
8. *Name some of the things that are left in a weakened condition after a stoppage of work.*
9. *Is it necessary for a manager to practice diplomacy in the management of his men?*
10. *Would you approve of a short series of lectures on handling men at which you would require the foremen and assistants to attend?*

LESSON XIV

ONE of the most neglected sources of overhead expense that is attached to the ultimate cost of coal mining is that of the taxes which must be paid upon coal property and which do not decrease with the depreciation of the entire property.

In this connection, I am not suggesting that by careful study of this short article the men for whom it was written, namely, mine managers, will in a short time become either tax experts or insurance actuaries, although both requisites are becoming more and more pertinent to coal mining, and cannot be overlooked in the future. To under-estimate this important feature, is to allow rising costs to continue without investigation as to their cause.

It is true that the trend of mining is toward very large operations, so located as to get the maximum advantage of collective energies of all sorts—of machinery, skill of workmen and operating officials—the whole operating from one head or one central point, and as one large family.

This of course can only be brought about by concentration. If the energies as before mentioned are so grouped or concentrated, a necessity for smaller taxes must arise, and unit systems of installation of machinery which are not running to their safe working load capacity, are not necessary.

If a mining property is composed say of 3,000 acres of coal land, being underlaid with a seam of coal valued at a nominal sum, and assessed at a certain valuation, it naturally follows that after a year or two, and after an output of 1,000 tons per day have been removed, the property should not be taxed as heavily as it was when this excavated coal was in the property.

It is the practice of some assessors in some localities to assess coal lands in two sections, which they class as " Developed Coal Lands " and " Undeveloped Coal Lands." The practice has always caused a lot of discussion and argument.

Undeveloped coal lands usually embrace those held by the original owner, who does not legally and taxably know there is any coal underlying the land, and consequently is required to pay but little tax for this coal land, or coal seam that is growing more and more valuable as its scarcity is felt in the locality in which it is situated.

Developed coal lands are the same lands after they have passed from the original owner, to the persons or companies who propose to open them up for commercial use, and who usually are required to pay an additional tax on the valuation of the coal, immediately after it passes into their ownership.

These taxes are assessed and adjusted triennial. That is they are adjusted every three years, and are not adjusted at any time between these years.

At these periods, companies or their agents are notified of the sitting of the county assessors, for the purpose of hearing arguments, for or against the increase or decrease in the amount of valuation and assessment upon the properties, and it is here the works management can greatly help themselves to what they are justly entitled to, if they will but take this matter into consideration, and give it the attention it deserves, which so far as has been my observation has been woefully neglected, by the parties who were or should have been held responsible for its consideration.

It has been said this matter is not within the province of the authority of the works management. This of course is partially true, in so far as very large properties are concerned, where a force of legal talent is retained or maintained as a separate department in the executive offices of the company. Even in that case, however, the wide-awake, up-to-date mine official will inquire as to the attention being given to this matter, and not take unto himself the attitude of a child being cared for and looked after by its parent or guardian, as this attitude fosters the spirit of paternalism, so objectionable to red-blooded aggressive thinkers and workers.

If the property is not so large, and consequently does not maintain a legal department, these duties usually devolve upon the works management or the manager of the plant, and the sooner he takes cognizance of this added duty, and accepts it with good grace, the sooner he has a chance to bring his costs down, making it more possible for him to place his products in

competition with the mines backed and owned by large capital and interests.

It is necessary here to repeat that this is not written to make tax experts, but to throw new light upon one additional duty required of the coming mine management.

Following closely, and in a way allied with valuation assessments and taxes, comes insurance, especially insurance against fire hazards. It can also be safely said that in cases of all fires there is always something destroyed or damaged upon which insurance is not collectible.

In tipples, power houses, fans and fan houses, engine houses, shops, stores, and last but not least dwelling houses, there is ever present the risk of fire.

Where these have been insured against a monetary loss, a lesser rate of premium can be had if certain conditions are conformed to, for instance if running water is in the buildings, if hose is supplied at certain places, if fire extinguishers of chemicals or sand are supplied. These and several other conditions will lessen the premium.

It should be a duty devolving upon the works management to direct, and receive a report of, the actual condition of these agencies to be used against fire hazards. In mining communities and many other communities fires are not of frequent occurrence, fire hazards are likely to slip by unnoticed until the fire appears, and when these preventive agencies are needed, it is found they have been moved, are not at their regular place, are not filled, not in working order, rusty, evaporated, used for something else, etc., and the purpose for which they were intended is entirely defeated. It is true the insurance companies pay the claims partially, but who pays for the workman's tools, his changing clothes, the private records he uses to help him solve his daily problems, his furniture if it be a dwelling house burning, his garden trampled over by fire fighters, and many other things? These and many other reasons should be sufficient to keep the mine management awake to the fact that there is a duty devolving upon him here that must be humanely reckoned with.

In addition to the fire hazards mentioned before, there is a hazard at a mining plant to which not much attention is given. It is the " mine fire." In all gaseous and non-gaseous mines the risk of fire is present. Where the seam gives off

explosive gas, and where the coal is dry, inflammable, and easily ignited, the chances for fire are much greater than where there is no explosive gas, where the coal is wet and where its inflammability is of a lesser nature.

Granting that these hazards are ever present, it can be reasonably asked, what have the companies done to lessen this hazard? What has the mine management or manager done to anticipate such a condition? Is it left to the underforeman or workman to protect himself? These hazards surely exist, because mine fires of a more or less magnitude are of frequent occurrence.

One of the best methods known to the writer is for the mine management to provide extinguishers loaded with chemicals to fight mine fires in their incipiency or early stage. In technical journals we read often that if the party discovering the fire had a bucket of water or a fire extinguisher, he quickly could have extinguished the blaze, which later caused a property damage alone amounting to thousands of dollars.

Chemical extinguishers of any size are very useful in coal mines, but *they must be loaded at the time needed.* If the colliery manager will supply three or four of these five-gallon type extinguishers at several points within the mine, at convenient places, and especially at points where new entries are being broken off, necessitating lots of bratticework and lots of penetration of new fissures in the coal or rock, they will be found to be a very valuable adjunct to the equipment for fire fighting.

QUESTIONS

1. *Explain in your own way what is meant by neglected source of overhead expense. Give an example.*
2. *Which property requires the most mine managements' attention along tax assessments, a large or small mine property? Explain briefly.*
3. *Can the mine manager be of any real value in representing his company at a triennial assessment hearing?*
4. *Do you think that a mine manager should know anything about this subject?*
5. *What is meant by "developed" and "undeveloped" coal lands?*

6. *Give reasons why a mine property should not be taxed for product taken out and sold in a previous year.*
7. *What measures can be taken to avail yourself of the opportunity of securing low fire insurance premiums?*
8. *Explain why insurance adjustments do not always cover the losses sustained.*
9. *How are many fires originated in coal mines?*
10. *What equipment would you provide to guard against fire hazards in coal mines?*

LESSON XV

One of the most prolific sources of tying up capital in mine management comes from the fact of not standardizing, as far as possible, the materials in use in the mines, and about the plants, and the spares, supplies, etc., needed for their upkeep.

It is not an uncommon occurrence to see that many mining concerns like the Black Chunk Coal Company carry supplies to the value of £5,000 to £10,000, in order that a steady flow of output shall not be interfered with, except as little as possible.

It is not uncommon to see at mines steel rails ranging in sizes from 18, 20, or 25 pounds per yard, to the large sizes of 85 pounds to 90 pounds per yard.

It would therefore seem that this condition of affairs should have more attention from the mine management. The fact that so many different sized rails are used is evidence of the fact that foresight was not used in the beginning of operations, or the sizes would have dropped down to three, and a possibility of four sizes

Carcful analysis of the probabilities of the best size mine tubs to be used should be made, whether this size would likely suit the several other mines which the company will likely open up, after which a size rail to suit a given load can be established with a reasonable degree of accuracy.

For instance if the tubs and coal have an approximate weight of 4000 pounds, the following sizes would seem to be very efficient: 18 pounds for rooms, 25 pounds for room entries, and 40 pounds per yard for main entries. If the tub and load should weigh 9000 pounds, the room size could be 25 to 30 pounds per yard, room entries about 40 to 45 pounds per yard, and main haulages about 80 to 90 pounds per yard, these sizes differing of course with the weights of loads, lengths of trips, size of locomotives and grades and speeds the trains were to be hauled. The only point desired

to be made here is that three or four sizes of stock are sufficient to carry.

It must also be understood that there is considerably more security in using the larger size rails, but there is also considerably more expense in getting them to the working place, and having them laid either by workmen in their places or by trackmen employed to lay the rails.

Large sized rails are very inconvenient in coal mine development work ; they are heavy to handle, harder to bend, harder to get round curves, and of course harder to recover and remove. The latter part of course is offset by the fact that they do not need so much spiking, consequently can be laid looser and removed quicker, but this feature is questionable, being dependent upon the power available to move them.

It would seem, then, that one of the fundamental requisites of an efficient mine manager would be to guard well his spares or supplies, so that as little capital as possible, consistent with good practice, is tied up in extra rails stocked for general use.

After rail stocks come the stacks upon stacks of mine ties of various sizes, and lengths, due to different sized tubs, different track gages, and different prices at which they can be purchased, coupled with the probable indefinite delivery of this material. It would seem that a six months supply of mine ties for a large mine would be about the average supply necessary ; at least it is a generous supply.

In using ties of the different thicknesses a great mistake is made in buying tee iron or railroad spikes of improper sizes to fasten them with. It is not uncommon to go to some mines and find spikes 3″ x ½″ instead of 2½″ x 3″ or 4″ x ½″ instead of 3½″ x ½″. It does not appear to be a matter of importance, but when the management figures the wrecks, delays, and damage caused by the ties splitting, the subsequent loosening of the rails, or the spikes not being able to be driven clear down to the heads, due to being too long, it can be seen that the right sized spikes are absolutely necessary for efficient and economical work.

The fact of the poor recovery of spikes in mine work often brings about the necessity for many explanations. One seems to be continually buying railroad spikes for mine

tracks, and while the rails are recovered pretty well, spikes and their ever shortage cannot be explained, Sometimes by being driven too hard after they are down, their heads are broken off. Others while being started into hard wood, fly from the tie after the hammer stroke. Others wear under the head by the vibration and friction of the rails moving while under passing trips. Others oxidize or rust just under the head where they are exposed to sulphur water; this allows the heads to break or bend, making their recovery impossible. While all these things are true, many more spikes could, and would be recovered, if the management could have, or would have, a heart-to-heart talk with the workmen, pointing out graphically the loss sustained by the non-recovery of material, of which spikes form a part.

Workmen as a rule are not indifferent to saving or recovering material, if the importance of such action can be impressed forcibly upon them, but the trouble lies in the fact that the mine management do not take sufficient time, or go into details enough, for the workmen to see the significance of the saving. The mine workman has probably not had the business training the mine officials have had, and his keenness of perception, his ability to grasp matters quickly, is not trained systematically. After the talk of the manager he says, "I just didn't understand what the manager meant," or "I wonder why he is so persistent in saving spikes"; perhaps he may say, "His talk was good, but he didn't show me where I'd be benefited by saving spikes," or he may say, "New spikes are easier to drive than straightening out the old ones, so I'm not going to bother much about hunting up old ones when I can get new ones."

The foregoing, then, shows forcibly that the end the manager expected to gain by his talk to the workmen, was not realised. He had not got the idea to the men as he wanted to. He failed to make the proper impression. It must necessarily follow that the manager should give very careful study to his line of argument and persuasion before giving his talk to the workmen.

Then come the pit props, posts, timber, setc., thousands upon thousands of them, piled up in rows, sometimes in rings, and sometimes not piled at all, just merely thrown

down in any hit or miss fashion. This stacking and subsequent use of mine timber is very important, and should have careful attention from the mine management. They should be sized and placarded somehow, say with a sign above reading "6 feet" or "4 feet 10," or anything that would designate the size of the prop.

The relative advantages of preservation of mine timbers by the several different methods has not been taken up very thoroughly by mine managements, beyond the fact that preservatives are used in the painting of buildings and structures about the mines. The merits and demerits of the different wood preservatives with their ultimate saving to the mine operator, depend upon several things, among them being the first cost of the timber, the life expected, the cost of renewals, the available supply, and deliveries to be expected. However, in all cases wood preservation is a factor to be reckoned with by the coming successful and efficient mine officials.

The methods used in getting timber into the working places is faulty, we find long props in low places, short props in high places, props in headings and narrow workings where they will not be used, props in cross-cuts or break-throughs put there when the headings or entries were driven. If a car of props goes wrong in transit, brattices are built in front of them, and they are lost.

It is very evident, then, that if the management would have an inspection made of the locations of props not serviceable where they are, and a subsequent gathering up of these stray unused props, the timber cost would be materially reduced, and just here it might be well to say that some figures have it that the average cost of timbers of all kinds at the mines is close to 30 per cent. of the entire cost of mine supplies; therefore, the use and abuse of timber must be reckoned with before it is too late.

Then come the different sizes and capacities of mine tubs. Even when a firm knows and expects to open up several mines in the same seam, in the same locality, different sized and shaped mine wagons are used. Different gages of tracks are used, when by a little forethought all the equipment could have been standardized and made interchangeable, thereby eliminating the necessity of carrying supply parts for but one type and

size of tub. In addition to this lessening of capital tied-up in supply parts, if one plant for some reason or another could spare fifty or a hundred mine tubs, they could be used to advantage, to increase the output in another mine, this being only two of the reasons why standardization of mine tubs and mine tub parts should be followed as nearly as possible.

Mining machines used for cutting or loading come in for the same criticism, by reason of the fact that because one machine was in use, although it did not serve our purpose as well as we would like, it was kept because we had it, and by its keeping we were handicapped by competitors using a different and more efficient type of machine.

Here the mine management should have been able to see that the continued expense of an inefficient machine would soon overrun the cost of a new and efficient machine. The efficient machine would stop the leak at once; the continued use of the old machine lets the expense go on forever. Standardization of machines and machine parts, allowing interchangeability of any or all parts, permits of a great saving in time and money and cuts down to a minimum the capital tied up for spares.

The mine locomotives seem to be in the same class. I have seen mines with eight or ten locomotives of almost as many different sizes and makes. This upon inquiry was due to the fact that requisitions for locomotives were not made in time, and available locomotives were purchased as quickly as possible, regardless of their type and make, requiring of course a very large amount of money to carry spare parts required for so many sizes of locomotives and for which no two pieces were interchangeable.

It would necessarily follow, then, that the modern mine manager must be awake to the advantages and disadvantages of carrying mine supplies. He must be able to discriminate between the supplies needed most often and supplies not needed so often, or perhaps very rarely, thereby keeping plenty of the former, fewer of the latter.

In order to do this, a report from the stock clerk showing him the quantity of the different supplies on hand, the quantity used in the last three or last six months, should come to the mine manager at intervals as wanted by him.

As a check against the possibility of error in keeping surplus

stocks, when requisitions are printed they should contain spaces for this data, and the purchasing department, or any interested department, could guide themselves as to time available, money available, and deliveries of any or all of the items on the requisition.

Often, for divers reasons, it is not found expedient to purchase the quantity of supplies ordered by the mine management, and this shortening is not always taken with good grace. Here the management at the mines should understand that nearly everybody has some private and delicate reasons for acts that may seem peculiar to the uninformed; but when it comes to mining supplies, if the mine management can show on record his requisition, the fulfillment of which would have helped him, he will be clear of censure; and he can always rest assured that the higher-ups are just as anxious for decreased costs as the mine management.

QUESTIONS

1. *Explain some of the sources where capital is tied up at mines, and which could be lessened.*
2. *What disadvantages are there in not using the right sizes of spikes?*
3. *How many different sizes of mine rails would you advise?*
4. *What governs the sizes of rails to be used?*
5. *What governs the size and lengths of ties to be used? Give examples of your meaning.*
6. *What should the colliery manager do in order to get his meaning of conservation grasped by the workmen?*
7. *What are some of the advantages of having mine tubs interchangeable at different mines?*
8. *How many different kinds of pumps or mining machines would you advise purchasing? Give reasons for each size.*
9. *State some of the reasons why it is expensive to have many different sizes and makes of mine locomotives?*
10. *How would you guard against accummulating an excessive stock of supplies?*

PRINTED IN GREAT BRITAIN BY THE DEVONSHIRE PRESS, TORQUAY

SEP. JUN 12 1964

TN
274
V57
Mining

Virgin, Robert Zerubabel
Mine management

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

UTL AT DOWNSVIEW
D RANGE BAY SHLF POS ITEM C
39 11 08 03 08 005 2